DISARMAMENT

A periodic review by the
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The Conventional Armed Forces in Europe Treaty

The Paris Summit: A Disarmament and Security Assessment

Gilles Andreani

The summit meeting of heads of State or Government of the States participating in the Conference on Security and Co-operation in Europe (CSCE), held in Paris from 14 to 21 November 1990, resulted in the conclusion of a series of disarmament and security agreements which have no precedent in European history.

The agreements comprise:

—The Treaty on Conventional Armed Forces in Europe (CFE Treaty), signed at the Elysée Palace, on 19 November 1990, by 22 States, supplemented by a Joint Declaration of the same 22 States;

—The document on a new set of confidence- and security-building measures, approved in Vienna, at the negotiator level, on the eve of the summit by the 34 States participating in CSCE; and

—The final document of the Paris summit, signed on 21 November 1990, which takes note of the above-mentioned agreements and complements them by establishing security-building institutions, the main one being the Conflict Prevention Centre of CSCE, and by setting guidelines

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for the 34 CSCE States to follow in continuing the process of disarmament and confidence-building in Europe.

Taken together these various elements constitute the foundation of a new balance of security in Europe: much remains to be done to build a stable and lasting peaceful order on our continent.

The results of the Paris summit, which symbolize the end of the cold war, stand in counterpoint to the past and establish the conditions necessary for further progress in security-building and disarmament in Europe.

The Results of the Paris Summit: Disarmament, Confidence-building and Dialogue

Disarmament: the Treaty on Conventional Armed Forces in Europe

It is no exaggeration to say that the CFE Treaty is the most ambitious disarmament agreement concluded to date. Negotiated in less than two years, it establishes, for 22 countries, strict and verifiable limits on levels within the major categories of conventional equipment throughout most of the European continent. As a result, more than 100,000 tanks, armoured combat vehicles, artillery pieces, aircraft and helicopters will have been either destroyed or permanently withdrawn from Europe.

Objectives

Under the mandate of the CFE negotiations three objectives were assigned to the sessions which began in March 1989 at Vienna:

—The establishment of a stable and secure balance of conventional armed forces at lower levels;

—The elimination, as a matter of priority, of the capability to launch a surprise attack;

—The elimination, as a matter of priority, of the capability to launch large-scale offensive operations.

The Treaty signed on 19 November 1990 at Paris meets these three objectives.

The first objective is attained through *parity*, which the Treaty establishes between the forces of the Atlantic Alliance and those of the Warsaw Pact in the five equipment categories already cited (tanks, armoured combat vehicles, artillery, combat aircraft and attack helicopters). In several of these five categories parity is only nominal, since in practice various imbalances will remain: the countries of the Atlantic Alliance have, in effect, been obliged to accept, at the request of the Soviet Union, higher ceilings than their current equipment levels, in the case, for example, of artillery and aircraft. But these minor disparities will, in any event, be much less serious than the general imbalance in every category which existed previously in favour of the Warsaw Pact.

The second objective, the concern to eliminate surprise attack capabilities, has led to a series of measures designed to complement parity by genuine conventional *stability* in Europe. Two provisions of the Treaty serve that purpose:

—*Regional differentiation*, which establishes weapons ceilings for the four concentric regions into which the negotiators have divided the European continent. This is designed to reduce the possibility of concentrating forces in the "contact" zones (Central Europe and the "flanks") and to compel participating countries to reduce their "forward" forces and deploy them in the rear of their territory.

—The obligation to place in *permanent storage sites* a proportion of the land-based weapons authorized in the zone. This also serves the objective of preventing surprise attacks, since the removal of such weapons from their storage sites becomes an unavoidable (and immediately detectable) precondition for any offensive military operation.

The third objective, that of preventing large-scale offensive operations, is served, in the Paris Treaty, by a *sufficiency rule*, which limits the military equipment which any party may station in the area of application. It thus establishes the principle that no party may possess more than one third of the total level of armaments authorized for the 22 participants. The political message of this rule is without doubt the most significant element of the CFE Treaty: no one must be able to dominate Europe by force of arms, or to use military supremacy for the purpose of political influence.

Thus translated into specific provisions, the objectives of the mandate would remain unattained if the Treaty did not contain clauses providing for transparency and verification. This mechanism, established in some haste at the end of the negotiations, and accordingly somewhat complex, is based on two elements:

—The obligation, incumbent upon each party, to provide the other parties with detailed periodic information on its armed forces, and, in particular, the major categories of equipment which are subject to the Treaty limitations;

—The right of the parties to carry out on-site inspections, at locations which may or may not have been disclosed by the other parties, to verify the accuracy of the information provided.

Limitations of the Treaty

The CFE Treaty certainly does not provide a solution to all the problems of European security, for two main reasons. First, its scope is strictly confined to Europe. As a result, the obligation to destroy equipment in excess of the agreed ceilings—stipulated in the Treaty—loses much of its significance. The Soviet Union has been able to withdraw east of the Urals more than half the equipment which was emplaced in Europe at the start of the negotiations in order to shield it from the CFE Treaty restrictions without being in formal violation of the Treaty. This equipment represents a potential circumvention of the Treaty limitations.

The second limitation of the Treaty is that it reflects the old European order rather than providing for the future security of our continent: it is essentially a transitional agreement. The initial Western plan, put forward in March 1989, was based on such premises as the existence of two coherent military alliances in Europe, the division of Germany, and the presence of Soviet forces in Central and Eastern Europe, premises which were totally invalidated over the 12 months separating the fall of the Berlin Wall and the Paris summit. The negotiators were forced to adapt their initial ideas constantly to the new European realities. The adaptation was largely successful—the CFE negotiations even contributed to a final settlement of the German question by providing an appropriate framework for the unilateral commitment to limit the manpower level of the German army. However, the structure of the Treaty quite clearly still reflects a bipolar conception of European security, inherited from the cold war, which does not in itself correspond adequately to the less acute but more complex and diversified security problems now facing the European countries.

One final uncertainty hangs over the CFE Treaty, namely the very future of the Soviet Union: the negotiations, from the mandate stage, were characterized by a significant change in Soviet security policy, to wit, acknowledgement of the Soviet Union's conventional superiority, and agreement, *grosso modo*, to relinquish it in Europe. It is possible that the change was precipitated by events in Central and Eastern Europe which the Soviets were unable to control. That will be for historians to decide. The fact remains that the CFE Treaty forms part of a broader Soviet policy, with theoretical underpinnings provided by the concepts of "defensive orientation" and "sufficiency". This policy is today the subject of debate in the Soviet Union and may not, unfortunately, remain in effect. As soon as the agreement was signed, implementation difficulties appeared on the Soviet side which could affect ratification of the Treaty. There is inevitably a great difference, for European security, between a CFE Treaty applied in good faith by all, including in spirit (that being essential in terms of non-circumvention), and one applied reluctantly, indeed compromised in its implementation by a restrictive interpretation. However, fidelity to the spirit of openness and confidence-building embodied in the Paris Treaty should, let us hope, lead to satisfactory implementation of the Treaty.

Confidence and Dialogue

The document on a new set of confidence- and security-building measures (CSBMs) approved in Vienna by the 34 States participating in CSCE strengthens the framework of the Conference on Security and Co-operation in Europe.

Negotiated and concluded within the CSCE framework, the 22-State CFE Treaty cannot be separated from the 34-State CSCE agreement endorsed in Paris on a new set of confidence- and security-building measures. This agreement may have paled because of its proximity to the CFE Treaty on which public attention has tended to focus. The fact remains that, in relation to the Stockholm Document of 1986, the document which emerged from the negotiations carried on in Vienna since March 1989 represents an extremely significant step forward in four respects.

1 A main series of measures dealing with the *exchange of information* on armed forces. There are two aspects: the commitment of participants to furnish a series of detailed data each year on their armed land-based and air forces in Europe; and the possibility of verifying the accuracy of

these data by means of a random assessment procedure (visits, on short notice, to another party's units).

2 A second series of measures involving adjustments of and improvements on the Stockholm régime: they relate to the annual schedule of military activities, possibilities of observation and inspection modalities.

3 Then comes a series of measures which proceed from an approach to security issues which is based on dialogue and co-operation. They are a follow-up to the seminar on military doctrine which the chief military officials of the 34 participating countries attended in January 1990 in the context of the CSBM negotiations. They relate to:

—Organization of regular meetings to assess and improve the implementation of the Stockholm document;

—Exchange of information concerning the military budgets of the 34 participants;

—Agreement on the date of a second seminar on military doctrine.

4 Lastly, there is one measure, the one relating to unusual military activities, which must be mentioned separately. This is a *sui generis* provision concerning crisis management in Europe and it will be implemented by the Conflict Prevention Centre. It allows any State which has concerns regarding any kind of military activity carried out by another participant to obtain a prompt explanation from that State, either bilaterally or within the CSCE framework.

A New Framework for European Security

These confidence-building measures cannot be dissociated from the strengthening and institutionalization of CSCE which was decided on at the Paris summit; they lay the foundation for, and outline the first tasks of, the Conflict Prevention Centre which is soon to be set up in Vienna. They testify to a flexible, open and authentically multilateral approach to European security issues; such an approach should, in the long run, prove more suited to the real nature of security problems in Europe than the bipolar CFE framework, particularly if the waning of East-West confrontation proves to be lasting.

The success of the CSBM negotiations and the outcome of the Paris summit have confirmed the central role played by CSCE in the process of disarmament and confidence-building in Europe. This was understood by the Heads of State or Government when they decided that the process should continue in a single forum open to all 34 participants. Once the complementary phase of CFE negotiations (called "CFE IA") is over, whereby the limits agreed to in the Treaty of 19 November 1990 will be complemented by limits on manpower levels, a single CSCE process will take over from the two temporarily separate negotiations among the 22 States and among the 34 States.

France's Objectives: to Foster the CSCE Framework and Methods While Taking into Account the New Requirements of European Security

Ever since 1978, when it launched the idea of a conference on disarmament in Europe involving the 35 participants in the CSCE process, France has worked unremittingly to ensure that disarmament in Europe used the CSCE framework and methods: from the Madrid mandate in 1983 until the Paris summit at which French ideas finally prevailed, going through the decision to place the CFE negotiations within the CSCE framework, that has been one of the most remarkable constants of France's disarmament policy. It satisfies basic concerns: to ensure that each State embarks on the road to disarmament in its own name rather than via the collective disciplines of the blocs; to prevent the multiple and complex data relating to European security from being placed in the same category as the numerical balance between alliances; and the conviction, above all, that a fundamental improvement in relations between States cannot be separated from progress in disarmament and that the technical process of arms control must continually be related to the major political events of the moment.

This is what France has endeavoured to do throughout the Vienna negotiations, which culminated in the agreements reached in Paris last November.

It has done so right from the stage when Western proposals were being formulated, by proposing to its partners a rule of national sufficiency, independent of the numerical balance between alliances.

It has done so throughout the negotiations, by ensuring that the CFE Treaty remains consistent with European political developments. For example, France has sought to ensure that the collective obligations of the Treaty would be translated, upon signature, into a series of national ceilings that would be binding on each State party. It has advocated the establishment of a system of verification based upon bilateral reciprocity of each party's rights and obligations in respect of inspection. Finally, it has sought to promote joint approaches with the countries of Central and Eastern Europe, even going so far as to present joint proposals.

In addition, France has ensured that other aspects of disarmament are taken into account. For example, the 34 participants undertake, in the final document of the summit, to become party to the agreement on chemical disarmament currently under discussion in Geneva as soon as the negotiations are completed. The declaration of the 22 signatories to the CFE Treaty recalls the importance of concluding an Open Skies agreement relating to the opening of airspace, which in our view should give a new dimension to the unflagging efforts to increase transparency and confidence.

After the Paris summit, France remains determined to pursue this approach to issues of security and disarmament in Europe, bearing in mind the new facts of European security. There are three such facts:

—In Europe itself and between Europeans, security issues increasingly warrant a diversified, multilateral and voluntary approach to disarmament. Dialogue, dispute settlement procedures, transparency and better understanding of the doctrine and intentions of the other parties may well prove to be more important in the future than mere reductions in forces.

—Experience with the implementation of the CFE agreement has shown us that European security cannot be considered only within the strict geographical confines of our continent. We must find a way to look beyond and to deal more rigorously with the possibilities of circumvention of agreements existing beyond the area bounded by the Atlantic and the Urals.

—Finally, the CSCE experience can help to advance dialogue and security in areas of tension or conflict: that is in the interest of the Europeans, particularly in the Mediterranean and in the Middle East, where they are directly involved. The idea is not simply to transpose the CSCE concept, which remains essentially a European concept, to that region but to try to find what particular tailor-made synergism of political dialogue and advances in confidence and in disarmament can be worked out in that region. That should be a priority of European political security following the Gulf conflict.

The Conventional Armed Forces in Europe Treaty

The Treaty on Conventional Armed Forces in Europe

Michael Moodie

On 19 November 1990, the 22 nations of the North Atlantic Treaty Organization (NATO) and the Warsaw Treaty Organization (the Warsaw Pact) signed the Treaty on Conventional Armed Forces in Europe (CFE) in Paris. Successful implementation of the CFE Treaty, which limits five major types of conventional weapons deployed in the region from the Atlantic Ocean to the Ural Mountains, will virtually eliminate any European nation's capability for surprise attack or for large-scale offensive action. When it enters into force as an internationally binding and verifiable agreement establishing limits on future military power in Europe and providing for the destruction of excess weaponry, the CFE Treaty will represent a solid foundation for expanded political, social and economic co-operation among all European States. It will provide an underlying element of certainty and confidence in an era of rapid change. Implementation of the CFE Treaty will thus reduce the likelihood of war in Europe and help to build a régime of security and stability which European States have not known for generations.

At the time of writing, however, questions have arisen regarding future implementation of the CFE Treaty.

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Those questions have been generated by the actions of the Soviet Union when Treaty-relevant data were exchanged at the time the Treaty was signed. Moscow must satisfy the concerns expressed by all the other Treaty signatories over its action if the full benefits of the CFE Treaty are to be realized.

Why a CFE Treaty?

Since the end of the Second World War, the massive numerical superiority of the conventional forces of the Warsaw Pact, in particular the Soviet Union's heavy armoured divisions, deployed forward in Eastern Europe, represented the greatest threat to the security of Western Europe. The conventional forces in the area from the Atlantic Ocean to the Ural Mountains was the largest military concentration ever known in peacetime. In the assessment of NATO, the Warsaw Pact's enormous holdings of equipment most suited for offensive action (primarily tanks, armoured combat vehicles, and artillery) were far in excess of what the Soviet Union and its allies required for defence. The speed, fire-power and mobility of the Warsaw Pact forces constituted a major threat, particularly in the case of a surprise attack, that would confront NATO allies with the choice of accepting defeat or resorting to the use of nuclear weapons. Acknowledgement by the Warsaw Pact States that these disparities existed and their declared willingness to reduce them provided the basis for successful CFE negotiations.

The CFE Negotiation Begins

The CFE negotiation began on 9 March 1989 in Vienna. Under the terms of the mandate, negotiating parties were divided into two groups—the 16 members of the Nato Alliance and the 7 members of the Warsaw Pact.

The objectives of the negotiation, mutually agreed by all NATO and Warsaw Pact members, were the establishment of a secure and stable balance of conventional forces at lower levels; the elimination of disparities prejudicial to stability and security, and the elimination, as a matter of priority, of the capability for launching surprise attack and for initiating large-scale offensive action. As the negotiation progressed, NATO positions were guided by the belief that no one country should be allowed to dominate Europe by force of arms and that there should be a limit on the amount of equipment that could be stationed outside national territory. In addition, the Alliance promoted measures that would prevent the redeployment of forces withdrawn from one part of the region from the Atlantic to the Urals to another.

President Bush's Initiative

In the opening phase of the negotiations, although all participants agreed on the general thrust of the talks, the specific scope was the subject of intense debate. On 29 May 1989, at a NATO summit meeting, United States President Bush secured agreement from the Allies on an initiative for expanding the scope of the talks and accelerating the timetable for implementing a CFE agreement. The President's creative proposals brought new momentum to the negotiations and advanced NATO interests while addressing Eastern concerns. Included in the package were such important elements as locking in Eastern acceptance of the proposed Western limits on tanks, armoured combat vehicles, and artillery pieces (pending resolution of the definition of each category of equipment), a requirement that reduced equipment be destroyed, inclusion of limits on all land-based combat aircraft and helicopters in the region from the Atlantic to the Urals at a level 15 per cent below the existing NATO level, and a proposed manpower ceiling of 275,000 each on United States and Soviet ground and air forces stationed outside their respective national territories and in the region from the Atlantic to the Urals. In addition, President Bush advocated an accelerated timetable for reaching and implementing a CFE agreement, urging completion of the talks within a year. Subsequently, on 13 July 1989, two months ahead of its own schedule, NATO proposed to the Warsaw Pact a revised CFE package which incorporated the essential elements of the President's initiative, and which, to all intents and purposes, established the framework for the remainder of the talks.

Political Revolution in Eastern Europe

In the autumn of 1989, one East European Communist Government after another collapsed, making possible the unification of Germany and changing the military and political context of the CFE negotiation. Indeed, when the Soviet Union announced its intention to withdraw forces from Eastern Europe and when the newly elected Governments there disclosed their own plans to reduce the size of their military forces, some questioned whether a CFE Treaty was still necessary. The negotiating parties, however, did not agree. A treaty remained the best insurance that the Soviet Union's unilateral actions could not be reversed legally at a later date, since it would contain important provisions not found in bilateral and unilateral arrangements for troop and armament reductions. Among these provisions were the requirements that the military equipment reduced to treaty limits would be destroyed so that it could not be reintroduced into the Atlantic-to-the-Urals region; a verification régime would be implemented to include detailed data exchanges and on-site inspection, which would not only enable NATO to monitor treaty provisions and deter violations, but would also have a significant confidence-building effect. Finally, only a CFE Treaty would constrain both the size and the disposition of Soviet forces inside the western Soviet Union.

A CFE Treaty in Sight

At a NATO summit in London in July 1990, Allied leaders called CFE NATO's "highest arms-control priority" and they proposed that once a CFE treaty was signed, follow-on talks should begin which would build on the concluded agreement, but with additional measures, including limitations on manpower in Europe. With this goal in mind, they agreed that Germany would make a commitment at the time of the signing of the CFE Treaty concerning the manpower levels of a unified Germany, consistent with the agreement reached between Chancellor Helmut Kohl and Soviet President Mikhail Gorbachev as part of the "2+4" process leading to German unification. In a speech on 30 August 1990 to the CFE plenary session, the Foreign Minister of the Federal Republic of Germany and the Prime Minister of the German Democratic Republic jointly stated that, at the time of the signature of a CFE Treaty, they would undertake that the future armed forces of a unified Germany would not exceed 370,000. Within this overall number, no more than 345,000 would belong to the ground and air forces covered by the CFE mandate.

In concert with the German manpower commitment, NATO formally proposed that the CFE Treaty contain a commitment to CFE follow-on talks with the same participants and mandate. NATO also proposed that all CFE participants agree to a political commitment not to increase manpower while follow-on negotiations were under way. The Warsaw Pact States subsequently accepted these proposals, eliminating manpower levels as an issue for resolution in the original CFE negotiation.

The CSCE Ministerial Meeting

On the margins of the CSCE Ministerial Meeting in New York in October 1990, United States Secretary of State James A. Baker III and then Soviet Foreign Minister Eduard A. Shevardnadze, in consultation with foreign ministers from all participating States, agreed in principle on all outstanding major issues in CFE. Although some tough negotiating would occur in the subsequent six weeks, this intensive meeting was critical in making possible the signing of the CFE Treaty in Paris on 19 November 1990.

At the conclusion of the New York meetings, Secretary Baker highlighted four major achievements of the prospective Treaty.

First, CFE participants could now match the autumn 1989 political revolutions in Central and Eastern Europe with a military revolution. Implementation of the CFE Treaty would accelerate the construction of a new European order which would be more stable and legitimate politically and militarily.

Secondly, the CFE Treaty would be the first post-war conventional arms control treaty signed by both the United States and the Soviet Union. The previous effort aimed at stabilizing the European military balance, negotiations on the mutual and balanced force reductions (MBFR), had languished for over fifteen years.

Thirdly, the Treaty would require the Soviet Union to destroy thousands of pieces of military equipment, ensuring a more secure and stable European military balance.

Fourthly, even if times should become less certain in the future, the provisions contained in the Treaty for intrusive monitoring and inspection would make Europe safer.

The last obstacles to a CFE treaty disappeared early in November 1990, when, after consultations with Allies, Secretary Baker met with then Foreign Minister Shevardnadze in Moscow and resolved a number of outstanding issues, including the limits and the disposition of equipment in various parts of the region from the Atlantic to the Urals and technical verification questions.

The CFE Treaty: What Is In It?

The CFE Treaty applies to 22 nations and tens of thousands of armaments spread over an area of more than 1.5 million square miles. It is probably the most ambitious arms control agreement ever concluded.

Equipment

The CFE Treaty limits tanks, the chief instruments of an offensive attack, to 20,000 for each group of States. Since the Warsaw Pact nations hold over half the tanks in Europe, this limit will require the reduction of thousands of Eastern tanks, primarily through destruction, significantly enhancing the stability of the region from the Atlantic to the Urals.

Linked to the need to reduce tanks is the need to reduce armoured combat vehicles. These vehicles, which include armoured personnel carriers (APCs), the more capable armoured infantry fighting vehicles (AIFVs), and heavy armament combat vehicles (HACVs), provide infantry mobility and support during combat and can be a crucial factor in an offensive campaign. The CFE Treaty sets limits of 30,000 armament combat vehicles for each group of States and a subceiling of 18,000 for each group of States for AIFVs and HACVs, of which no more than 1,500 for each group of States can be HACVs.

Under the CFE Treaty, each group of States is also allowed 20,000 pieces of artillery—guns, howitzers, mortars and multiple rocket launchers of 100 mm calibre and above. Artillery is important because it provides essential fire-power for conducting combat operations.

Given the versatility, lethality and mobility of aircraft, the West agreed with an initial Soviet demand that the CFE negotiation should include combat aircraft. Therefore, all land-based combat-capable aircraft in the region, regardless of current role, mission or assignment, were considered. Accordingly, the CFE Treaty limits combat aircraft to 6,800 for each side, excluding primary trainers. In addition, the 22 signatories made a political commitment outside the Treaty to limit land-based naval aircraft to 430 for each group of States, with no more than 400 for any one country.

Finally, the CFE Treaty limits attack helicopters to 2,000 for each group of States. These aircraft offer fire-support, flexibility and rapid mobility, which gives them an important role in military operations.

In connection with the CFE Treaty, the six members of the Warsaw Pact signed a treaty at Budapest on 3 November 1990 which allocates the holdings of the Warsaw Pact group of countries by country. Similarly, the members of NATO have consulted through NATO mechanisms and have agreed to national entitlements, referred to in the Treaty as maximum levels of holdings. These national entitlements may be adjusted, however, through agreement with other members in the same group of countries.

Sufficiency

One of the most important elements of the Treaty is the "sufficiency" rule. This limits the proportion of arms held within the region from the Atlantic to the Urals by any one country to about one third of the total for all participating countries. This provision constrains the size of the Soviet Union's forces more than any other in the Treaty. The sufficiency limits for any one country are: 13,300 tanks; 13,700 artillery pieces, 20,000 armoured combat vehicles; 5,150 combat aircraft; and 1,500 attack helicopters.

Verification

A central feature of the CFE Treaty is the ability to verify effectively the reduction of armaments and the maintenance of ceilings at lower levels. The inspection régime will complement national technical means of monitoring compliance with Treaty provisions and will generate increased confidence by requiring access to all declared sites and reduction facilities.

The Treaty includes provisions for detailed information exchanges, to validate holdings declared at signature, on-site inspection (both mandatory and "challenge" inspections, the latter of which can be refused), and on-site monitoring of destruction. Parties have an unlimited right to monitor the process of reduction. At the initiative of the United States, NATO nations have established a co-ordinating mechanism to co-operate among themselves in conducting on-site inspections. The Treaty also establishes a Joint Consultative Group, which will consider measures to enhance implementation of the Treaty and address questions relating to compliance with the Treaty.

For the first four months after the Treaty enters into force there will be an intense period of "baseline" inspections to validate the data. After this, there will be a three-year period in which reduction of Treaty-limited equipment (TLE) will take place. During this period, the parties will have the right to monitor the destruction process and to conduct mandatory on-site and challenge inspections. At the conclusion of the reduction period, there will be another four-month period of intense inspections—a second "baseline" period. Thereafter, mandatory and "challenge" on-site inspections will be used to monitor continuing compliance with the Treaty. Throughout the life of the Treaty there will be regular, detailed information exchanges. The Treaty also calls for an aerial inspection régime, the details of which are to be negotiated during follow-on talks in Vienna.

Reduction

The CFE Treaty requires that the equipment reduced to meet the ceilings be destroyed or, in a limited number of cases, rendered unusable for military purposes, while converting it for non-military purposes. After the four-month "baseline" period, there is a further 12-month period in which 25 per cent of the reduction must be completed, 60 per cent by the end of two years, and all reduction required by the Treaty must be completed by the end of three years. The Treaty parties have five years to convert limited amounts of equipment to non-military uses.

Other Treaty Elements

The Treaty contains other provisions that will contribute to confidence and stability in Europe. The most important of these is the storage provision, which limits the readiness of both groups of armed forces by imposing equal ceilings on equipment that may be in active units. Other ground equipment must be in designated permanent storage sites. The limits for equipment each group of parties may have in active units are: 16,500 tanks; 17,000 artillery pieces; and 27,300 armoured combat vehicles.

In addition to these limits on the number of armaments in each category which each side may maintain in active units in the region from the Atlantic to the Urals, the Treaty also includes regional numerical sublimits. Sublimits on holdings of ground-force equipment in active units constrains further the potential for a surprise attack. These sublimits will also help prevent destabilizing force concentrations of ground equipment, particularly on the flanks.

The Importance of the CFE Treaty

The CFE Treaty represents an essential building block for a new European security architecture based on co-operation rather than confrontation. The agreement ensures that this new security architecture rests on a stable military basis.

The reduction of equipment in the region from the Atlantic to the Urals to a level of equality between West and East will decrease the threat to all negotiating parties. Although the Soviet Union will continue to have the largest army in Europe, it will not be able to mass overwhelming forces against NATO's central front on short notice.

In addition, successful completion of the CFE Treaty represents a milestone in the history of arms control. Previous conventional force negotiations in Europe (the MBFR talks), which involved only 12 NATO members and all Warsaw Pact nations, were confined to a smaller geographical area (Central Europe), dealt only with manpower, and did not lead to an agreement. In contrast, the CFE negotiation involved all 22 members of NATO and the Warsaw Pact, applies to all of Europe, from the Atlantic Ocean to the Ural Mountains, deals with five major categories of conventional armaments, and has resulted in a Treaty signed by all the participants. In the CFE negotiation, NATO seized the opportunity to remove the military threat the West has faced since the beginning of the cold war: the huge conventional military imbalance led by heavily armoured Soviet forces, which had cast a shadow over Europe for almost 45 years.

Conclusion

Clearly it is in everyone's interest that the CFE Treaty be ratified and implemented. In testimony before the United States House Foreign Affairs Committee, however, Secretary of State Baker stated that he would not recommend that the President send the Treaty to the Senate for advice and consent to ratification unless concerns generated by Soviet actions since the time of Treaty signature were satisfied. Secretary Baker's concerns, and those of the other 20 Treaty signatories, relate to Soviet action in regard to three matters.

First, there was some concern that Moscow did not report all of its holdings in the area from the Atlantic to the Urals at the time of signature. While the extent of the problem was not clear, there were indications that Moscow had not indicated in the data exchanged at the time the Treaty was signed all the Treaty-limited equipment in the zone or all the places at which the equipment was located.

Secondly, prior to the signature of the Treaty, Moscow moved thousands of pieces of Treaty-limited equipment east of the Ural Mountains and out of the region. With no treaty signed or in force this was obviously not a legal violation of any agreement. However, the argument has been made that through such equipment transfers the USSR has sought to avoid the obligation to destroy large amounts of equipment that would, had it stayed in the zone, have put the Soviet Union far in excess of its allowed levels. At the very least, it diminishes confidence in Soviet good faith. The United States continues to seek from the Soviet leadership assurances on the future disposition of this equipment east of the Urals, with the expectation that it will not be exploited to alter the strategic balance in Europe or in Asia in the future.

Thirdly, and most seriously, the Soviet Union has refused to accept clear-cut Treaty obligations by re-subordinating former army divisions holding Treaty-limited equipment to the Navy and by arguing that such forces as well as others assigned to such units as strategic rocket and other forces are not covered by the scope of the CFE Treaty. In this regard, the Treaty—and the negotiating record—are unambiguous. Article III of the Treaty says "all" equipment of the relevant types "within the area of application shall be subject to numerical limitations", with seven specific exemptions. None of those exemptions relates to equipment assigned to such units as naval infantry, coastal defence forces, or strategic rocket forces, as Soviet officials have contended. Moreover, the mandate is legally superseded by the provisions of the signed CFE Treaty. There is simply nothing—anywhere—that supports the Soviet argument.

This issue is not a matter of treaty interpretation in which two reasonable views might be reconciled. It is not a question of ambiguous treaty language. It is a matter of compliance with a clearly stated treaty obligation.

The United States remains hopeful that these issues will be quickly resolved and that the CFE Treaty—which remains a historic accomplishment—can be quickly ratified and implemented. The Treaty represents an important contribution to an emerging environment in Europe of great benefit to all States. It is unfortunate that the process of implementation has been slowed by self-serving actions that starkly contrast with the spirit of co-operation with which the agreement was negotiated. It is time to return to that spirit of co-operation and allow the CFE Treaty to become the important achievement it is intended to be.

The Treaty on Conventional Forces in Europe—a Polish View

Tadeusz Strulak

The Treaty on Conventional Armed Forces in Europe (CFE), signed in Paris on 19 November 1990 by the Heads of States or Government of 22 States, has been widely acclaimed as a major—indeed unprecedented—disarmament move, of far-reaching military and political effect. It certainly is, to borrow a metaphor from a British weekly, "the biggest scrap-metal deal in history", providing as it does for the reduction in Europe, from the Atlantic to the Urals, of some 20,000 tanks, over 8,000 artillery pieces, over 17,000 armoured combat vehicles and over 1,500 combat aircraft. That reduction amounts, on an average, to some 45 per cent for the Warsaw Treaty States and to about 10 per cent for those of the North Atlantic Treaty Organization (NATO). These figures, both absolute and relative, are highly impressive, particularly when considered against the background of past efforts. After the first negotiations between the NATO and Warsaw Pact States

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began in the autumn of 1973 on the mutual reduction of forces and armaments in Central Europe, the Western demand for the withdrawal from that area of 1,700 Soviet tanks was considered excessive by the Soviet Union and in a later phase of those negotiations, which came to an end early in 1989, the two sides failed to agree even on the withdrawal from Central Europe of some 20,000 Soviet and American troops.

The CFE Treaty also sets limits on all the above-mentioned categories of conventional weapons to be reduced, as well as on attack helicopters. These limits will be in the form of equal collective ceilings in these weapons categories for the two groups of States: 20,000 tanks and pieces of artillery, 30,000 combat armoured vehicles, 6,800 combat aircraft and 2,000 attack helicopters. The ceilings will no doubt serve to stabilize the military situation in Europe at much lower levels of armaments. Some might say these levels will still not be very low. That is of course true, for the reduced figures do represent formidable military capability. However, the reductions to be undertaken and the post-reduction limits established (as well as the regional or zonal sublimits aimed at preventing the two sides from concentrating their weapons too close to one another), together with a developed system of detailed information exchange and intrusive verification, for which the CFE Treaty provides, ensure a degree of transparency that will practically eliminate the possibility of launching a major surprise military action in Europe, thus assuring the predictability and stability of the military situation. This will certainly be the military result of implementation of the Treaty, and will have the greatest importance for the increased security of its signatories, including, in particular, Poland.

Of great importance for Poland's security, too, is the specification in the Treaty, next to collective weapons ceilings, of the so-called sufficiency limit on the five weapons categories of the individual States. Such a limit prohibits any country from holding more than a specific proportion (about one third) of the permitted particular weapons quotas in the area to which the Treaty applies, which may, otherwise, be freely shared, respectively, by States within each of the two groups. In practice, the sufficiency clause concerns the States with the highest military potentials in the area covered by the Treaty.

In this connection, another important element—not in the Treaty itself but in a note accompanying its signature—is the declaration of the Government of Germany limiting the strength of that country's forces to 370,000 men.

No less significant are the political results of the CFE Treaty. Next to the transformations in the countries of Central and Eastern Europe and the unification of Germany, its conclusion is a clear manifestation of a changed political situation in Europe. Above all, the Treaty denotes—in the military field—an end to the era of confrontation in Europe, a fact which helps to clear the way towards political integration of the continent.

While the commitments undertaken by the States parties are basically of a collective, or bloc, nature, the Treaty nevertheless results, in objective terms, in a weakening of the role of military alliances. As far as the future of the Warsaw Treaty is concerned, it certainly serves to facilitate the proposed actions aimed at phasing out the intra-Alliance military co-operation and the liquidation of the military structure of the Warsaw Pact.

There is, in my view, one preponderant consideration with regard to the CFE Treaty that should be noted and that is going to determine the course of its implementation—once the Treaty enters into force following its ratification—as well as the success of CFE-II negotiations and the future of the disarmament process in Europe in general. It is the close connection between European disarmament negotiations and the dynamics of the political relationship between the participating States as well as of internal developments in those States.

I alluded earlier to the Vienna negotiations by NATO and Warsaw Treaty States on reductions of armed forces and armaments in Central Europe, popularly referred to as MBFR (mutual balanced force reduction) talks. Those negotiations lasted 16 years and, despite great efforts and much good will, failed to produced agreement even on reductions which by today's standards seem meagre indeed. The odds were against it, the feeling of the negotiators most of the time having been one of the lack of the necessary high-level political will for agreement on the part of all those concerned. Unlike the case of MBFR, by contrast, there was an over-abundance of high-level political will—and pressure—for agreement during the CFE negotiations, which made it possible to produce an immensely complicated Treaty with its eight detailed protocols in only 20 months. Here, too, one might say that the negotiators worked against some odds, but of a completely different kind. They were prompted, challenged and forced by the rate of tempestuous developments in Europe, especially in its central and eastern part, which almost from one day to the next were opening new vistas and creating completely new conditions for the progress of disarmament, indeed sometimes running ahead not only of the negotiators' position papers but even of their imagination.

The result to date, as I have tried to prove above, is a formidable one. The CFE Treaty now awaits ratification by all signatories before it enters fully into force. Following a further reduction period of 40 months it should result in a considerably disarmed, more secure and more stable Europe. But several of the vital provisions of the Treaty and sections of some protocols have already been put into effect on a provisional basis. They concern the exchange of information by States regarding their conventional armaments, the declaration of intended respective post-reduction limits on their armaments, establishment of a joint consultative group to promote the objectives and the implementation of the Treaty, inspections and immediate continuation of the negotiations on conventional armed forces (that is, CFE-II), with the goal of building on the CFE-I Treaty. The immediate provisional application of a part of the Treaty certainly underlines the seriousness of the intent of the 22 signatory States. So too does their declaration not to increase the authorized peacetime personnel strength of their conventional forces in the area of application of the Treaty.

One is thus certainly entitled to say that the European disarmament and security process is now firmly on its way. This, however, should not make anyone oblivious of or complacent about the enormous and very difficult tasks that are facing it in both the near and the more distant future. First and foremost, there is a need for speedy ratification of the CFE Treaty and for its full and timely implementation. Indeed, it is the manner of implementation of the Treaty by all its signatories—from the beginning to the end—that will be decisive for maintaining good faith and confidence upon which the whole process is based. In this connection one cannot fail to note the misgivings arising around the exchange of data on the present holdings of conventional armaments in the Treaty application area which was effected on the eve of the Treaty's signature, as well as with regard to the declared number of the so-called objects of verification. These misgivings concern in particular the data presented by the Soviet Union, their clarification, correction and completion now appearing critical for the Treaty ratification and its further implementation.

As a participant of the MBFR negotiations to which I have referred above I would point out here that those negotiations had been thwarted largely by persistent, unresolved disputes on data. Such a dispute was wisely avoided in the negotiations on the CFE Treaty, and one would wish and hope that no such dispute now paralyze the Treaty's implementation. It is important to bear in mind that implementation of the Treaty will coincide with the planned massive withdrawal of Soviet troops from the territories of four countries in Central Europe—Germany, Czechoslovakia, Hungary and Poland—a process that must be duly taken into account in shaping and filling the limits on troops and armaments for that crucial zone.

Then there is the question of the speedy negotiation and conclusion of a new agreement—CFE-II. The CFE-I Treaty sets the CSCE follow-up Helsinki meeting in 1992 as a target date for terminating negotiations towards this end. The objective of the CFE-II agreement is generally described as comprising additional measures aimed at further strengthening security and stability in Europe. Among such measures identified in the CFE Treaty are limits on the personnel strength of the participants' conventional armed forces within the area of application of that Treaty. Next to this measure, several others should conceivably be tackled under an expanded substantive scope of a CFE-II agreement. One idea that comes to mind is the need to enlarge the limits already adopted so as to cover new categories of armaments (for example, tactical missile launchers, transport helicopters and aircraft) or to introduce a set of stabilizing measures (for example, widening the scope of information on existing and planned new weapons systems, covering the storage régime, the structure of troops and their combat readiness).

An important task, closely connected to strengthening of security, is certainly a further lowering of the limits on conventional armaments already established.

The objective of increased stability seems to prompt paying more attention to regulations aimed at enhancing it at the regional level, for example through ceilings on the number of weapons (and troops) in each of the four zones (not only, as now, the central and flank zone). The same purpose would certainly be served by introducing regional "sufficiency rules"—limits not to be exceeded by any country in the region.

Such an arrangement would also come closer to the solution of a very pressing issue, that of basing the structure of limitations on national commitments. A way will have to be found to move to such commitments from the present collective or bloc ones. This is a requirement, not of a technical but of a highly political, security nature, for adjustment to the changing realities of Europe, its central and eastern part in particular.

In conclusion, I should like to emphasize the following points regarding the process of conventional disarmament in Europe:

—A lot has already been achieved in this process, both in material terms (largely through withdrawals and reductions by States of Eastern and Central Europe) and in the agreed Treaty arrangements (reductions, limitations, information, verification), therefore the process is firmly on its way;

—These results are largely due to radical political changes in the countries of Central and Eastern Europe and the ensuing transformation of East-West relations;

—Despite all these highly positive developments, further progress of the disarmament process in Europe should not be taken for granted: it requires determined and speedy action on the part of all 22 signatories of the CFE Treaty to implement it, and parallel, equally speedy and effective CFE II negotiations to consolidate and expand the scope of disarmament and security arrangements and, above all, bring them into accord with the new political developments in Europe, notably the democratization processes in its central and eastern part. Needless to say, the durability of these latter processes will largely determine the dynamics of disarmament and progress towards enhanced security and stability in Europe. Any drawbacks in democratization must therefore be seen with concern in this context also;

—The economic factor weighs heavily on political, systemic changes in Central and Eastern Europe. The rate and, indeed, the fate of these changes is conditioned by imaginative and timely economic co-operation and assistance on the part of the Western CSCE partners.

Poland's national interest determines its strong and unequivocal support for the firm implementation of the CFE Treaty and for the success of CFE-II negotiations along the lines specified above. The Polish people see in the meaningful European disarmament process a way that will help them become part of an integrated Europe—a priority goal of Polish foreign policy.

The Role of the United Nations in Disarmament

Yasushi Akashi

It is particularly appropriate that this Conference on "The United Nations, Disarmament and Security: Evolution and Prospects" is being held here in Moscow. In recent years, the Soviet Union has been an advocate of constructive change in international relations as well as a source of creative thinking about the possibilities of multilateral diplomacy. An apt example of such creative thinking is the Soviet Government's recent memorandum "The United Nations in the post-confrontation world",[1] which contains many ideas that deserve careful study. When the history of our present period is written, it may well conclude that Soviet efforts were instrumental in remaking the United Nations into the kind of instrument for peace and security that its founders truly intended.

What brings us together is a shared conviction that multilateral arms limitation and disarmament offer a gateway to a more peaceful, secure world. Very few of the enduring security problems of the past and very few of the emerging ones facing the world today can be solved without the co-ordinated actions of large numbers of States. Thus, multilateralism is not some lofty Utopian goal; it is not a favour that strong States offer to weak ones; and, above all, it cannot be regarded as an option that we pursue at our leisure. Rather, multilateralism has become an urgent ne-

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cessity—one that must engage the creative energies of all States.

It is a truism to say that we live in a period of unprecedented change. The events of the past year in Europe, and more recently in the Persian Gulf and elsewhere, continue to reverberate through the United Nations. The Organization is being called upon as never before to act collectively against aggression; to mediate disputes; to keep the peace; to promote democracy; to defend human rights; and to fight poverty, under-development and environmental decay. Throughout the United Nations there is a renewed sense of pride and purpose. The question we need to address here is how to find the proper "fit" between disarmament diplomacy and these other security-related activities that will define the role of the United Nations in the next decade and beyond.

Frankly, the task of forging collective global action on disarmament in this new era is going to put our strength and our wits to a severe test. While the end of the cold war is immensely promising, it has not ushered in a millennium of peace; the road ahead is still strewn with obstacles. Regional instability, ethnic violence and religious strife are obvious factors for continuing discord; so too is the hitherto unparalleled militarization of many societies which has become a central characteristic of our age. Given these challenges, it is imperative that we re-examine both the ends and the means of the United Nations' disarmament activities from a fresh perspective.

In this spirit I should like to address two related questions. First, what are the proper lessons to be drawn from past experience? Secondly, what kind of steps do we need to take to achieve progress in the future?

Lessons of the Past

The path of global arms limitation and disarmament negotiations over the past three decades is so familiar to all of you that it scarcely requires even a brief summary. From the early 1960s to the mid-1970s—that is about one half of the past thirty years—an impressive number of multilateral agreements were brought into force. The major milestones are well known—they include the partial test-ban Treaty, the outer space Treaty, the non-proliferation Treaty, the sea-bed Treaty, the biological weapons Convention, and other agreements.

Looking back, many observers regard these years as something of a *belle époque* for multilateral disarmament diplomacy in the United Nations system. The work was substantive and wide-ranging; global forums were the centre of world-wide attention; and everyone sensed that the stakes were high. Most important, perhaps, the governing concepts for global diplomacy were clear and compelling: wherever weapons of mass destruction are not yet deployed, do not deploy them; and whoever does not yet possess such weapons, do not acquire them. These were the goals of global diplomacy, with formal agreements as the primary means.

From the mid-1970s to the late 1980s, the pattern of diplomacy was starkly different. Bilateral diplomacy between the two major Powers and European arms-control negotiations moved to centre-stage, leaving multilateral forums in the shadows. The momentum towards new global agreements slackened noticeably, and criticisms were heard that the multilateral agenda was being skewed towards grandiose or over-ambitious goals and away from long-standing priorities such as a halt to nuclear testing and chemical disarmament. Moreover—and this is important—the character of the diplomacy itself was changing. From the number of review conferences and the outcome of the last two special sessions devoted to disarmament, it would seem that while our agendas and our forums were growing in size, our workload was becoming ever more managerial and procedural in nature.

Amidst all of these changes—indeed perhaps in part because of them—multilateral disarmament diplomacy lost its clear conceptual focus. Comprehensive prohibitions and truly preclusive agreements have not proved to be very practicable outside the category of weapons of mass destruction. It is one thing to preclude the stationing of nuclear weapons on the sea-bed or in orbit, but quite another thing even to agree on whether or how to address a broader range of military activities occurring in international domains such as outer space or the high seas. Furthermore, because of problems that scarcely need elaboration here, the idea of using the non-proliferation Treaty as a model for future agreements has not proved very attractive to a substantial part of the international community, notwithstanding the impressive number of States that are now parties to that agreement.

I would like to think that we have left the frustrations of this earlier era behind. In the next few years we have a new opportunity to reinvigorate multilateral diplomacy; to get it back on track; and to give it a clear direction. Fortunately, the dissolution of tensions between East and West will help matters considerably; we have already seen a marked improvement in the atmosphere of our debates. At the same time, to seize the opportunities that may exist, I think we are well advised to heed several important lessons of the past.

First, we must be more discerning in the way we define success or failure in our multilateral disarmament endeavours. If experience teaches anything, it is that progress cannot be measured solely by the number and frequency of new agreements or conventions. Treaties are not like trophies; we do not mount them on walls or put them up on shelves where they gather dust. Rather, treaties require constant vigilance to ensure compliance with them and they represent but one step—albeit an important one—in a continuous process of activity.

Indeed, what we sometimes casually refer to as the multilateral process deals as much with identification of issues, determination of priorities and choice of mechanisms as with reaching agreements. In the field of disarmament, this "process" may go through several phases. It often starts with an in-depth study of the issue by small groups of experts, where problems are identified and alternative approaches are suggested and clarified. It then moves to a second, wider deliberative stage, where consensus among States is forged on the need for active negotiation. Should consensus be reached, active negotiations are then conducted in a third stage, which is crowned by the completion of an agreement.

A fourth stage occurs when an agreement is implemented. Here, the initial institutional arrangements for reductions and data-exchange are carried out. A fifth stage involves monitoring and the verification of compliance. Problems which arise may be dealt with through consultation among parties and, if necessary, enforcement activity aimed at offsetting violations. Finally, in a sixth stage, an agreement may be modified, amended or extended as appropriate, through a periodic review process.

I am not suggesting that the disarmament process is always as neat or orderly as this. The essential point I wish to make is that in charting our future efforts, we should measure progress by the kinds of improvements and innovations we can make in each of these steps. Activities such as expert studies and keeping treaties up to date are not nearly as glamorous as negotiating new agreements; but they are vital from the standpoint of keeping the disarmament process attuned to changing political realities.

A second lesson is that multilateralism in the sphere of arms limitation and disarmament requires a dynamic and effective bilateral process. Many observers tend to see bilateral and multilateral endeavours as being competitive rather than complementary. But the kind of bilateralism to which I refer is quite different from that which we have seen in the past fifteen years or so. Concretely, it means that the two major Powers must reach accord on two principal issues.

One issue concerns the scope for future global negotiations, be they on outer space, on navies, on a comprehensive nuclear-test ban, on arms transfers, on advanced weapons technology, or on the many other current issues. Most existing agreements would not have been completed without a degree of prior consensus at the bilateral level on basic objectives and on a strategy for assuring the active participation of key States in such multilateral negotiations. I wish I could say that such a strategy exists now but, to be frank, I see little evidence of it apart from the notable exception of that relating to chemical disarmament.

The other dimension of bilateralism concerns the conduct of North-South relations. The major Powers must be able to agree on the types of compromises that they are prepared to make with the larger community of States, including other developed countries, in the interests of obtaining fair and workable global agreements. As I noted earlier, it is often argued that the non-proliferation Treaty is fatally flawed as a model for future negotiations because it divides the world into "have" and "have not" States. While I understand the reasoning behind this criticism, I do question its implications for policy.

To my mind, the appropriate point to be drawn from the NPT experience is not that restrictions aimed at non-proliferation cannot work *a priori* but rather that obligations undertaken by nuclear-weapon States in order to balance the basic inequality accepted by "have not" States were prone to differing interpretations. Thus, we have endured numerous and at times confrontational debates over what actions would constitute a minimum level of compliance with article VI of the non-proliferation Treaty as it pertains to good-faith efforts to halt the nuclear arms race and to proceed with disarmament.

In the future, global régimes based on the principle of offsetting inequalities may well be necessary in addressing certain global insecurities. But they cannot work without clear understandings on how to apportion the burdens and benefits of agreements—and such understandings, I submit, cannot be reached without effective and mutually beneficial interactions between bilateral and multilateral realms.

A third lesson to be drawn from recent history pertains to the machinery of disarmament. It is that institutional adjustments and fixes should not be allowed to divert our creative energies away from the truly hard issues of gaining agreement on substantive matters. Granted, steps to streamline and rationalize the work of our various forums should be carefully considered and vigorously pursued where appropriate; and we should always be conscious of the need to review the mandates and procedures of existing bodies to keep them focused and relevant. However, there is a clear distinction between these kinds of pursuits and more far-reaching restructuring activity, which can be costly in terms of time, effort and financial resources.

One of the unheralded accomplishments of the past decade is the degree to which the machinery within the United Nations system has become well-integrated and robust. There is a logical correspondence between our existing mechanisms and the six stages of the disarmament process that I mentioned earlier. Bodies such as UNIDIR, the Secretary-General's Advisory Board on Disarmament Matters, groups of governmental experts and the Secretariat can contribute in different ways to the research and analytical phases; the First Committee, the special sessions, and of course the General Assembly act as our deliberative "agenda-setting" bodies; and the Disarmament Commission is becoming a useful place to deal with selected issues that are worthy of special attention but do not as yet lend themselves to formal negotiation.

In the "treaty-making" phase of the process, the Conference on Disarmament retains its unique character as the single multilateral disarmament negotiating body with a representative membership, including the five permanent members of the Security Council. And of course within the ambit of particular agreements we have achieved well-developed procedures and mechanisms for review, consultation and amendment.

The one phase of the process that still lacks a clear institutional focus is that of monitoring and verification. The trend in this area has been to utilize or create institutions for treaty-specific verification purposes, such as the International Atomic Energy Agency and the prospective organization for the prohibition of chemical weapons to be set up under the convention. Because monitoring is a highly technical activity that is performed for the benefit of the parties to a treaty, there is inherent logic in the idea of relying upon single-mission institutions. This is not, of course, to exclude the longer-term possibility of a centralized verification institution within the United Nations system. But such an organization would of course have to prove itself effective on legal, political, cost-effectiveness, and perhaps even technical grounds, and as our Group of Experts concluded in their study on the role of the United Nations in verification, such a development is best seen as an evolutionary process.[2]

In the meantime, the United Nations can work in concert with interested States in alleviating verification concerns and setting priorities. As our Group of Experts noted, valuable experience has been gained from the Secretary-General's fact-finding activities that may be applied selectively to various agreements, as and when parties deem it appropriate.[3] In addition, the Secretariat is taking steps to strengthen the United Nations disarmament data base, especially in the arms expenditure area as well as in the chemical weapons area. Practical steps such as these can help to deepen Member States' knowledge of the intricacies of monitoring and verification, and thereby enable them to participate more effectively in the operation of treaties to which they are a party.

Prospects for the Future

How might the role of the United Nations in disarmament evolve in the future? One of our most distinguished Secretaries-General, Dag Hammarskjöld, once said that the United Nations is

> "... part of the great pattern of change in our time. It functions as a tool in the hands of Governments and peoples and individuals, in their effort to give that change a constructive direction."

In this post-cold-war era, Hammarskjöld's words capture the essence of our future endeavours. The rapid changes that are now occurring are simply too pervasive and all-encompassing to be met with a "business as usual" attitude. Together, we must truly take steps to give change a constructive direction. This task requires that we adapt and adjust multilateral diplomacy to the current sources of conflict and tension in the world, and that we be open to new methods and techniques for achieving our common goals of peace and security at the lowest possible levels of armament.

By virtue of its universal character, the United Nations is the most appropriate and indeed the only place where global consensus on key security and disarmament issues can be forged. Yet the Organization's precise roles cannot be summed up in short phrases or "sound-bites" that appear on the evening news. They involve aspects of a global sounding-board, agenda-setting, co-ordination, research, expert study and evaluation, fact-finding, mediation, and active negotiation, as well as information and education. Moreover, the job of strengthening these functions requires that we exercise judicious judgement on how to allocate our time and resources fairly among a growing number of priorities that vie for attention each year.

Let me briefly touch upon two critical areas where such judgements are needed.

First, we need to become more adept at managing the increasingly complex interrelationships between global negotiations and regional peace and stability. The great virtue of global multilateralism is that it offers all States, in every region, a chance to speak out on those issues that confront humanity as a whole. But there is also growing recognition of the fact that security problems are region-specific and are often best addressed with region-specific solutions. This applies increasingly to conventional armaments, ballistic missiles and arms transfers.

The United Nations has a responsibility to promote the principles of restraint and reciprocity in all regions. Obviously, we must be sensitive to the characteristics that distinguish one region from another: the kinds of techniques for disarmament and confidence-building that apply in one area may not be appropriate elsewhere. Nevertheless, the United Nations could help to strengthen peace and security:

—by formulating general guidelines for regional negotiation;

—by examining the lessons of existing regional approaches, for instance in Europe, and their applicability elsewhere;

—by promoting regional dialogues within forums that are already in existence at the global level; and

—by applying the methodology of arms limitation and disarmament to selected peace-keeping and peace-making activities, such as those in Central America and other areas.

In all these endeavours, I regard the regional and global forms of multilateralism as complementary and mutually reinforcing. Indeed, it is hard to imagine that one could exist without the other.

A second choice that is pivotal from the standpoint of future prospects involves the question of formal agreements on the one hand, and that of co-ordinated, unilateral measures on the other. Quite obviously, not every issue that comes before Member States at the United Nations will have as its ultimate solution the entry into force of a formal treaty. Negotiations are often slow and painstaking; and at times it is simply easier for countries to take sensible unilateral actions in a multilateral context than to hammer out every last detail of negotiated agreements that have the same effect.

Using the tools of transparency, such as data-exchange and standardized reporting formats, some of which are already available at the United Nations, Member States can take useful steps to clarify intentions and build confidence as a first step towards harmonizing national policies in the interests of restraint. This approach applies most clearly to military expenditures, defence conversion, arms transfers, and other issues where the rationales and justification for specific actions may vary widely among Member States.

Time has permitted me to touch upon only a few of the many issues that bear upon the question of future directions in disarmament and arms limitation. As I said at the outset, the challenges that lie ahead are substantial ones. No one can ignore the very real threat of conflict that looms over certain parts of the world. Over the longer term, however, I am optimistic about our prospects for success. The futility of over-armament and the logic of restraint are now more widely understood in the world than ever before in human history. We at the United Nations have both a duty to act and, I believe, the will to succeed.

Notes

1 General Assembly document A/45/626, Annex, dated 12 October 1990.

2 General Assembly document A/45/372 of 28 August 1990, para. 276.

3 *Ibid.*, para. 271.

Developments in Verification: Experiences in Bilateral Verification

Verification Problems: The Experience of Bilateral Negotiations

Evgueni N. Golovko

Ever since disarmament problems began to be actively discussed in the late 1950s, verification issues have occupied as important a place as arms limitation itself. They have in any case largely determined the framework for the discussion of arms limitation.

It is now widely accepted that without effective verification no serious steps can be taken towards safeguarding international security, strengthening strategic stability and curtailing the arms race.

The bitter, often ideological, quarrels over the problem of verification in the 1950s to 1970s and the early 1980s have been replaced by a business-like partnership among States. In fact, a kind of contest is going on between the Soviet Union and the United States as to who will take or demand the most far-reaching verification measures. As far as the conceptual development of the question of multilateral verification is concerned, the Soviet Union presented to the General Assembly of the United Nations, at its third special session devoted to disarmament, the idea of establishing under United Nations auspices a mechanism for wide-ranging international verification of compli-

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ance with agreements aimed at reducing international tension and limiting armaments and for monitoring the military situation in regions of conflict, and proposed that consideration be given to the idea of eventually instituting an international verification agency.

As the many verification régimes provided for in recent agreements and treaties are implemented, it is becoming clear that if we are to make the transition from verification as a political and propaganda slogan to verification as a genuine process, we must consider the complex realities of today's world. Verification cannot be total: it must allow for the need to limit intrusiveness and to ensure that verified facilities are able to go on functioning normally. This does not, of course, mean reviving the idea of limiting the scope of verification measures or establishing some sort of closed areas. Treaty verification must clearly be adequate.[1]

A number of considerations have arisen from the development and implementation of measures to verify bilateral arms limitation and disarmament agreements in the last five years. Soviet-United States bilateral efforts in the area of verification have become a kind of laboratory for measures to verify future comprehensive multilateral agreements.

Without question, the first and, so far, most important contribution to solving verification problems was made by the Treaty between the USSR and the United States on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (the INF Treaty), the first agreement in history to eliminate an entire class of Soviet and United States nuclear arms.

The signing of the INF Treaty demonstrated that with political will even the most complex verification issues can be resolved. Under the Treaty, 117 facilities in Soviet territory and 72 facilities in United States territory are subject to inspection. In the territory of the USSR and its allies, up to 300 inspections of the elimination of INF weapons will be carried out within three years and, in all, some 420 inspections over a period of 13 years. In the territory of the United States and its allies, around 100 and 250 inspections respectively will be carried out.

The verification régime under the Treaty can be divided into two categories of measures: notification and inspection. What makes the INF Treaty special is its clearly developed system of on-site inspections both in the territory of the USSR and the United States and in the territories of Soviet and United States basing countries.

The main components of this system are the following:

1 Inspections to verify baseline data, which are carried out in all missile operating bases and missile support facilities referred to in the Treaty;

2 Inspections to verify the elimination of missile operating bases and missile support facilities;

3 Inspections, on a quota basis, of active and eliminated missile operating bases and missile support facilities;

4 Inspections through permanent monitoring that weapons limited by the INF Treaty are not being produced in production facilities specified in the Treaty;[2]

5 Inspections of the elimination process at locations referred to in the Treaty;

6 Inspections to determine that the process of eliminating weapons limited by the Treaty is complete.

In order to verify compliance with the provisions of the Treaty, each side uses the national technical means of verification at its disposal while undertaking not to interfere with the other side's national technical means.

Both Soviet and United States specialists emphasize that the INF Treaty is being implemented carefully and that any questions that arise are being settled within the

Special Verification Commission established by the Treaty.

The INF Treaty and the Memorandum of Understanding on the application of the Treaty's verification provisions can serve as a model for the solution of verification problems in future disarmament agreements.

Work is proceeding on the protocol on inspection under the Soviet-United States Agreement of 1 June 1990 on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons. Most of its provisions have now been drafted.

A number of the verification mechanisms provided for in the INF Treaty have been included in the substance of the Soviet-United States treaty on the reduction and limitation of strategic offensive arms (START treaty).

Building on the INF Treaty, the two sides agreed, in the course of the Washington and Moscow summit meetings, to a number of measures for verifying compliance with the future START treaty, in particular exchanges of baseline data; inspections of baseline data; on-site observation of the elimination of strategic arms; continuous on-site monitoring of the perimeter and portals of major production facilities; short-notice on-site inspections of deployment areas in the process of reducing remaining weapons, deployment areas where such weapons have been stored and presumed areas of secret deployment, production, storage or repair; a ban on the use of covert or other measures to interfere with verification; procedures for verifying the number of warheads on deployed ballistic missiles of each different type, including on-site inspections; and more extensive monitoring, with the assistance of national technical means, of the reduction and limitation of strategic offensive arms. To help achieve the goals of the treaty, the two sides agreed to set up a joint compliance and inspection commission. They also began an exchange of data on their strategic forces.[3]

The Soviet Union responded positively to the June 1989 initiative by United States President George Bush concerning verification and stability and measures in the field of strategic offensive arms, in the belief that such measures might contribute to confidence-building. At the September 1989 meeting between the United States Secretary of State and the Soviet Foreign Minister in Wyoming, an agreement encouraging the development of such measures and outlining the principles for implementing them was signed which envisages, in particular, the development of procedures for verifying the number of warheads on deployed intercontinental ballistic missiles of each specific type, including on-site inspections. On the basis of this document, the corresponding procedures are being worked out at the Geneva negotiations on nuclear and space arms. The two countries tested a procedure for verifying the number of declared warheads in the course of trial inspections at each other's military bases in 1990.

One major problem is verification of long-range nuclear sea-launched cruise missiles (SLCMs). Although the two countries agreed that this type of strategic weapon would not be constrained by the treaty on strategic offensive arms, they will provide each other with unilateral declarations of their policy concerning nuclear SLCMs and annually, for the duration of the Treaty, with politically binding unilateral declarations regarding their planned deployments of such weapons—that is, those with a range in excess of 600 kilometres—provided that the number declared does not exceed 880.

The development of on-site verification methods with the assistance of gamma-spectrometry equipment is also of definite interest.[4]

Despite the complexities of bringing the Soviet and United States positions closer together on another major problem of their strategic relations, namely compliance with the ABM Treaty and prevention of the stationing of weapons in space, it is possible to find areas of agreement, among them verification measures, confidence-building and predictability. This offers an opportunity to expand areas of agreement and to do substantive work. The Soviet Union is in favour of developing, in the course of negotiations, a set of measures for building confidence and ensuring predictability, which would help increase the two countries' confidence that the obligations they assumed under the ABM Treaty are being strictly fulfilled. Contrary to the United States position that such measures must be aimed at facilitating a joint transition to a régime that is more heavily reliant on defence, the Soviet Union sees such an approach as contradicting the ABM Treaty and as liable to destroy strategic stability and undermine security.

Clearly, the American proposal for an independent agreement about predictability measures which would be separate from a draft treaty on defence and space—earlier the United States had insisted that predictability measures were an integral part of such a treaty—is in the nature of a tactical manoeuvre. Its goal seems to be to highlight dialogue with the Soviet Union on space questions and to create the impression that the Soviet Union is about to reach agreement with the United States position on a joint transition. In addition, of course, work must be continued on the establishment of a verification mechanism and of confidence-building measures for future agreements relating to the ABM Treaty and outer space. Of specific interest in this connection are the visits by a group of Soviet experts, at the invitation of the United States, to laboratories in Los Alamos and San Juan Capistrano and by American experts to the Soviet test site at Sary-Shagan.

Some sort of conceptual foundation for effective ways of preventing an arms race in outer space, *inter alia* through bilateral negotiations and including, of course, verification questions, could also be laid at the multilateral level. This could be done for example in the Conference on Disarmament, where increasing support is being given to the idea of working out, as a first step, measures to build confidence and increase openness in space activity, especially in the context of the Soviet concept of "open space" and the interesting proposals of the Federal Republic of Germany, France, Australia, Canada, Sweden and other countries.

The USSR and Canada are currently working on a project for the development of a joint experiment which would explore the possibility of monitoring the non-emplacement of weapons in outer space.

A nuclear-test ban continues to be the major focus of efforts to bring about the step-by-step elimination of nuclear weapons and complete disarmament. The Soviet Union is the consistent advocate of a multilateral treaty on the complete and general prohibition of nuclear tests. For example, it will be recalled that a draft treaty on the subject was introduced in 1975 in the United Nations General Assembly.[5]

In continuation of the efforts made at the end of the 1950s and the beginning of the 1960s, practical work was carried out at the tripartite negotiations between the Soviet Union, the United States and the United Kingdom at Geneva in the years 1977 to 1980.[6]

The course of the negotiations convincingly demonstrated that verification is not an obstacle in the way of a complete ban on nuclear testing, which depends purely on the necessary political will. This is borne out both by the history of the negotiations and by the conclusions of experts.

When the negotiations were broken off by the United States in November 1980, the problem was taken up by the Geneva Conference on Disarmament, which established, in April 1982, an *ad hoc* working group with a view to considering questions relating to the treaty on the complete prohibition of nuclear testing, including the question of verification. On 1 October 1982, the Soviet Union submitted for the consideration of the General Assembly at its thirty-seventh session the basic provisions of a treaty on the complete and general prohibition of nuclear-weapon tests, which contained some new proposals on, *inter alia*, verification.[7,8]

In 1987, the Soviet Union and a number of other Eastern European States submitted to the Conference on Disarmament a document entitled "Basic provisions of a treaty on the complete and general prohibition of nuclear weapon tests", which synthesized the contributions of many States with respect to the pressing problem of disarmament.[9]

Since, despite a number of unilateral moratoriums by the Soviet Union, the United States and other nuclear Powers were persistently moving away from the idea of an immediate ban on nuclear testing, the step-by-step approach agreed in 1986 at the meeting of the United States and Soviet leaders at Reykjavik was the most conducive to progress towards the ultimate goal of the complete cessation of testing.

The year 1987 saw the adoption of the joint Soviet-United States statement on the initiation, prior to 1 December 1987, of full-scale negotiations regarding this question. The step-by-step approach demonstrated its effectiveness. Because of that decision, the most significant practical progress to date was made with respect to nuclear testing.

As a result of complex bilateral negotiations, the two countries were able to agree on verification Protocols to the 1974 Treaty on the Limitation of Underground Nuclear Weapon Tests and the 1976 Treaty on Underground Nuclear Explosions for Peaceful Purposes, thereby establishing an effective system for monitoring the aforementioned agreements of the 1970s.

In the course of the negotiations, the two countries worked out in principle new verification methods. The Protocols set forth an effective triad for the verification of the threshold limitation of tests, combining hydrodynamic and seismic methods for measuring explosive yield with on-site inspection.

From a technical standpoint, these methods can, of course, be criticized on account of their high cost and complexity. At the same time, the combination of technology has, in our opinion, proved successful since, for the first time, it allows the limitation of nuclear testing to be monitored with a high degree of reliability.

According to the hydrodynamic method, explosive yield is calculated on the basis of direct measurements of the characteristics of the shock wave generated by the underground explosion, such measurements to be taken in a special drill-hole, shaft or tunnel situated in immediate proximity to the explosive device. According to the seismic method, the verifying party has the right to carry out independent measurements at three seismic stations specially selected for the purpose in the territory of the party being verified and, if it so wishes, may also obtain the requisite data from other seismic stations belonging to the latter party.

As a result of the negotiations, a new interpretation has been given to traditional methods, such as the seismic means of verification.

For the first time, it is possible to speak of the improvement of international verification procedures. As is known, the experts consider that nuclear explosions with a yield of more than 1 or 2 kilotons carried out in rocky ground can be distinguished with a reasonable degree of reliability from earthquakes.[10] With a view to monitoring compliance with the 1976 Treaty on Underground Nuclear

Explosions for Peaceful Purposes, the verifying Party is entitled, in the case of a group explosion whose planned aggregate yield exceeds 150 kilotons, to use the local seismic network, in addition to the hydrodynamic method of measuring yield and on-site inspection, in order to verify the number of explosions in the group.

A new form of verification under the partial test-ban Treaty is the use of on-site inspection for any test by the other Party with a yield of over 35 kilotons. The United States ultimately recognized the effectiveness of this method. In carrying out on-site inspection, the personnel of the verifying Party have the right to make a detailed investigation, with the use of equipment if desired, of the emplacement hole and to obtain rock samples therefrom. This enables the verifying Party to have a clear picture of the conditions in which the explosion was conducted, to dispel suspicion concerning possible ways of distorting the true explosive yield, for example by what is known as decoupling (that is, carrying out the explosion in a large underground cavity), and to obtain all the necessary data for an objective estimation of the explosive yield measured by its national seismic monitoring facilities.

What is important is the exchange of geological data and rock samples, since these can help to determine the explosive yield, allowance being made for the characteristics of the ground in the area of the site.

In addition, inspections provide the assurance that nothing is being done to distort the real magnitude of an explosion.

As regards the implementation of the 1974 Treaty and its Protocol, the latter provides for the establishment, immediately after the Treaty's entry into force, of a bilateral consultative body which would resolve specific questions connected with the practical implementation of verification measures provided for in the Protocol.

A positive feature of the bilateral negotiations which deserves mention is the *rapprochement* of the two countries with respect to the potential of the hydrodynamic method, earlier dismissed by the United States, and the seismic method, the effectiveness of which it had repudiated.

In the course of the joint verification experiment (JVE) in August 1988 in Nevada and in September at the Semipalatinsk test site, the two countries successfully tested their verification methods and were convinced of the need to combine them for the effective avoidance of a possible violation of the Treaty. The results of the experiment were largely responsible, in the final analysis, for the adoption of the two methods.

Under the agreement reached by the two countries, the Protocols to the 1974 and 1976 Treaties open up the way for the next stage of the negotiations. The Soviet Union and the United States will begin to consider further limitations on nuclear testing, thereby moving closer to the ultimate goal of the complete cessation of all nuclear tests, as part of the effective process of disarmament.

The verification system provided for in the Treaties, namely, the use of the network of seismic stations and on-site inspection, provides a solid technological base which will also be useful in devising a verification régime for the future treaty on the general and complete cessation of nuclear tests.

Notes

1 R. Barker, "The verification of arms control, disarmament agreements and security", *Disarmament*, vol. XI, No. 2 (Summer 1988), p. 6.

2 See Union of Soviet Socialist Republics, Ministry of Foreign Affairs, *Vestnik*, No. 10, 5 December 1987, pp. 25-27 and 80-89.

3 See "Sovetsko-amerikanskaya vstrecha na Vysshem urovne", Moscow, 29 May-2 June 1988. Dokumenty i materialy, M, Politizdat, 1988, pp. 189-190.

4 V. Thomas, "Verification of limits on long-range nuclear SLCMs", *Science and Global Security*, vol. I, No. 1-2, October 1989.

5 The text is reproduced in the annex to General Assembly resolution 3478 (XXX) of 11 December 1975.

6 See, in particular, W. Heckroote, "Verification of Test Ban Treaties" *in* W. C. Potter (ed.), *Verification and Arms Control* (D. C. Heath, 1985), pp. 65-74.

7 See *The United Nations Disarmament Yearbook*, vol. 7:1982 (United Nations publication, Sales No. E.83.IX.7), pp. 244-254.

8 B. P. Krasulin, "Politicheskie garantii ustraneniya yadernoy ugrozy". M, IMO, 1984, chap. III; R. M. Timerbaev, "Kontrol za ogranicheniem voorujeny i razorujeniem". M, IMO, 1983, chap. IV; V. V. Shustov, "Sovetsky Soyuz i problema prekrasheniya ispytany yadernogo orujiya, M, IMO, 1977.

9 See Conference on Disarmament document CD/756.

10 A. Krass, *Verification. How much is enough?* (SIPRI, Lexington Books, 1985), p. 72; W. J. Hannow, "Seismic Verification of a CTB", *Energy and Technology Review* (Lawrence Livermore National Laboratory, May 1983); and L. Sykes and J. Everton, "The Verification of a CTB", *Scientific American*, 247 (1982), pp. 47-55.

Developments in Verification:
Experiences in Bilateral Verification

A United States Perspective on Bilateral Verification

Edward J. Lacey

The Verification Function

Verification is a process which establishes whether the States parties are complying with their obligations under an agreement. With respect to bilateral arms control agreements, verification is necessarily a unilateral process; that is, one party to the agreement seeks to ensure that the other party is complying with the provisions of that agreement.

United States policy requires that arms control agreements be effectively verifiable. Effective verification has three components—deterrence, detection and assurance. First, beyond the weight of legal obligation to comply, we seek to deter the other party from violating an agreement by persuading it that if it commits a violation it will get caught. Verification helps deter violations by increasing the risk of detection and by complicating any scheme of evasion to the point where it becomes impractical. An essential element of deterrence is the knowledge that detection of a violation will entail some concrete response—a penalty that outweighs the benefits of the potential violation.

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The second component of verification is detection. The monitoring processes that support verification are designed to detect violations of an agreement, and hence to furnish, to the extent possible, timely warning of emerging threats to a nation's security arising from a violation of a treaty. Even so-called "minor" or "technical" violations could be of concern, inasmuch as they could represent the initial stages of large-scale cheating or be part of an effort to probe the other side's monitoring capabilities for deficiencies. Accordingly, United States policy requires effective verification and strict compliance with the provisions of an arms control agreement.

The third component of verification is assurance. Verification seeks to provide an assurance that an arms control agreement is being complied with. In this manner, it seeks to build confidence in the validity of the agreement and in the reliability of the other party to the agreement. Violations of the agreement rapidly erode this confidence.

Arms control agreements that are not effectively verifiable and not complied with can be more detrimental than beneficial to national security. Depending upon their nature, undetected violations could pose a serious threat to national security. Even the suspicion of a violation—based on ambiguous evidence—could breed distrust and undermine the benefits of an arms control agreement.

Determining Verifiability

Verification is a two-stage process. The first stage involves a legal and technical assessment of the degree to which a proposed arms control agreement, or a particular provision of such an agreement, can be verified. This assessment must measure present and anticipated future monitoring capabilities against the specific actions to be limited by the agreement or provision. It must consider credible "cheating scenarios", and take into account the standards of evidence required to make a determination of non-compliance.

The second stage addresses the question whether the postulated verification scheme for an arms control agreement is effective. This assessment is based upon the limitations specified in the agreement and the available verification monitoring capabilities. It is both an analytical effort—focused on such factors as the extent to which the provisions of an arms control agreement raise the potential risks of cheating—and a political evaluation—concerned with the past compliance record of the other party and the impact of potential non-compliance on national security and foreign-policy objectives.

Bilateral Verification

Most arms control agreements have been "bilateral", with verification based on one country's use of its own resources to verify the other signatory's compliance. "Multinational" and "international" verification are fairly specialized in application—the newly concluded Treaty on Conventional Armed Forces in Europe is illustrative of the former, while the work of the International Atomic Energy Agency (IAEA) inspectorate is representative of the latter. Bilateral verification consists of one country's capacities and efforts to monitor another party's compliance with the provisions of an arms control agreement. Verification of arms control agreements involves the use of both national means and negotiated measures.

National means of verification include all monitoring capabilities available to the verifying party. In recent years, this term has come to imply the technical collection assets known as national technical means (NTM). These include photographic, radar and electronic surveillance systems, as well as seismic instrumentation and atmospheric sampling capabilities (this last to detect radioactive particles from nuclear explosions). These national technical means systems are exclusively under national control. Their operation does not depend upon the co-operation of the other party to the agreement.

The term "national technical means" was first coined in the United States–Soviet Strategic Arms Limitation Talks (SALT) in the early 1970s. Both the Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty) and the SALT I Interim Agreement on Strategic Offensive Arms specify that

> "For the purpose of providing assurance of compliance with the provisions . . . each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law" (article XII of the ABM Treaty, article V of the Interim Agreement).

In order to enhance the effectiveness of national technical means, the parties to arms control agreements have negotiated measures banning interference with the operation of these systems, and prohibiting the deliberate use of concealment measures intended to defeat monitoring by national technical means. More recently, arms control agreements have included provisions requiring active co-operation with national technical means. An example of such a "co-operative measure" is the provision in the 1988 Treaty between the United States and the Soviet Union on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (the INF Treaty) requiring that roofs of fixed structures for missile launchers at select mobile intercontinental ballistic missile bases be left open for a given period of time while the actual missiles and their launchers are displayed in the open. The clearly stated purpose of this requirement is "to enhance observation by national technical means" (article XII).

The other principal negotiated measure employed in bilateral verification is on-site inspection, which provides the verifying party with direct access to the facilities and treaty-limited equipment of the other side. It can provide information in great detail, but is limited in space and time to the specific facility and occasion of the actual inspection. Nevertheless, on-site inspection can be a very useful complement to national technical means. It can be used to establish an accurate count of treaty-limited equipment, directly monitor the elimination of treaty-limited equipment as may be required by an agreement, and deter violations at known, agreed locations. More generally, it can provide an overview of whether the holdings at a given site are consistent with what is known of the other side's force structure.

Multilateral and International Verification

Technical collection systems could conceivably be jointly owned and operated by two or more States, becoming, in effect, "multilateral technical means". Likewise, an international body could be established to operate or co-ordinate the use of technical monitoring systems on behalf of the international community as a whole, such as, for example, the international satellite monitoring agency (ISMA) concept proposed by France in 1978. As originally proposed, ISMA was to be responsible for collecting, processing and disseminating information obtained by Earth observation satellites. Its mandate was to include fact-finding and verification. On-site inspection is also possible in both the multilateral and the international context. Inspection teams could be composed of persons from more than one country, and the information collected on the inspection could be shared equally among the participants. Alternatively, inspection teams could be wholly national in composition, but the results of the inspection could still be shared with other parties. Currently under consideration in NATO are plans to co-ordinate inspections and share information under the régime established in the Treaty on

Conventional Armed Forces in Europe. An international inspectorate made up of "international civil servants" already exists under the auspices of IAEA. They perform inspections at more than 600 nuclear facilities world-wide to determine whether nuclear material has been diverted from peaceful uses.

The fundamental difference between multilateral and international verification on the one hand, and bilateral verification on the other, is the degree of national control. The former necessitates reliance on monitoring means that in whole or in part are not under the exclusive control of any one verifying party. Bilateral verification is a wholly national undertaking.

The United States Experience with Bilateral Verification

The ABM Treaty

Two major elements of the ABM Treaty verification régime are particularly relevant to this discussion. The first is that verification of this Treaty is dependent entirely upon national means. These have proved adequate to the task, and have, for example, provided the United States with sufficient information to make a determination that Soviet construction of a large phased array radar near Krasnoyarsk was a significant violation of the Treaty. The Soviet Union admitted this violation, and has agreed to dismantle the radar completely. This Soviet admission was the direct result of United States verification efforts, strenuous objections to the violation, and repeated demands for corrective action. It clearly illustrates the importance and propriety of the United States policy that arms control agreements must be strictly complied with.

A second element of the ABM Treaty verification régime to be noted was the creation of the Standing Consultative Commission. Article XIII of the Treaty specified that a joint United States–Soviet commission should be established to "consider questions concerning compliance with the obligations assumed", and to consider possible measures for "further increasing the viability" of the Treaty. Each Government is represented by a commissioner, a deputy commissioner, and other staff as required. The Commission meets at least twice a year. The first session was held in 1973, and forty sessions have been convened since then. The Commission provides a forum in which questions may be raised about activities that could be at variance with provisions of the Treaty. It can also be used to clarify ambiguous situations and, potentially, to induce corrective actions with respect to activities that are not in compliance with the agreement. Notwithstanding this useful function, the Commission remains a consultative body rather than an enforcement mechanism. It cannot, by and of itself, compel compliance.

The INF Treaty

As with the ABM Treaty, the INF Treaty verification régime includes a bilateral consultative mechanism—the Special Verification Commission—and is reliant upon national technical means. With respect to the latter, as mentioned earlier, it also includes co-operative measures designed to enhance the effectiveness of national technical means.

Unlike the ABM Treaty, however, the INF Treaty is not solely dependent upon national technical means for verification. The INF Treaty incorporates a new element in the verification of United States–Soviet bilateral arms control agreements: an extensive and elaborate on-site inspection régime. For over 40 years, beginning with the 1946 Baruch Plan to control the spread of nuclear weapons, the United States has sought to establish on-site inspection as a means of verifying compliance with arms control agreements. Although in the late 1970s the Soviet Union exhibited some willingness to accept on-site inspection on a limited basis, it was not until the signing of the INF Treaty that it was established as a major component of verification in United States–Soviet bilateral arms control agreements.

The INF Treaty and its integral Protocol on Inspections provide for five types of on-site inspections: baseline, close-out, quota or short notice, elimination, and portal monitoring. The baseline inspections were intended to assist in verifying the exchange of data between the two sides referred to in the Memorandum of Understanding appended to the Treaty. The Memorandum included numerical and locational data on some 8,000 pieces of INF equipment—nearly 6,000 Soviet and 2,000 United States—as well as the technical characteristics of the intermediate-range missiles and launchers of the two sides. Between 1 July and 31 August 1988, United States and Soviet inspectors carried out a combined total of 146 baseline inspections at facilities in the United States, the Soviet Union, Belgium, Italy, the Federal Republic of Germany, the Netherlands, the United Kingdom, Czechoslovakia, and the former German Democratic Republic. They successfully inventoried the Treaty-limited equipment detailed in the Memorandum of Understanding, and confirmed the technical characteristics of the Treaty-limited weapons systems.

After all items of Treaty-limited equipment are removed from a facility designated in the INF Treaty, and all activity related to the Treaty has ceased, a close-out inspection may be conducted to confirm that the facility is no longer engaged in prohibited operations. As of late 1990, the United States had conducted close-out inspections at 98 of the Soviet Union's 133 facilities, while the Soviet Union had confirmed the close-out of 7 of the 31 United States facilities. Additional inspections of all facilities covered in the INF Treaty are permitted for 13 years. For the first three years of the Treaty régime, each side is permitted

20 such inspections per year. Each side is allowed 15 inspections annually during the next five years, and 10 annual inspections in the final five years. These inspections are intended to confirm compliance with the terms of the INF Treaty. They are sometimes referred to as "short-notice inspections", since the stringent time-lines specified in the Treaty's Protocol regarding inspections permit such inspections to be launched within as little as 30 hours. The United States and the Soviet Union have each conducted about 45 of these inspections.

Elimination inspections are intended to confirm the dismantling or destruction of Treaty-limited equipment in accordance with procedures stipulated in the Protocol on procedures governing the elimination of missile systems. The Soviet Union began eliminating its equipment in August 1988. The United States began the following month. By late 1990, United States inspectors had carried out some 110 elimination inspections, confirming the elimination of over 1,700 Soviet INF missiles and some 4,000 pieces of other Treaty-limited equipment. In the same period, Soviet inspectors confirmed the elimination of approximately 570 of the United States' 846 missiles, as well as of over a thousand pieces of other Treaty-limited equipment.

Portal monitoring inspections consist of reciprocal, continuous, on-site inspection activities at two former missile production facilities—the United States Hercules Plant near Salt Lake City, Utah, where the Treaty-limited Pershing II missile was produced, and the Votkinsk Machine Building Plant in the Soviet Union, which formerly assembled the SS-20. The Treaty permits both sides to maintain a 24-hour-a-day watch outside the gates, or "portal", of the designated plants. Inspectors at the portal are entitled to inspect shipments leaving the plant that are large enough to hold the relevant Treaty-limited equipment. These inspections are intended to preclude the possibility that Treaty-banned missiles could continue to be produced in the guise of missiles or space-launch vehicles not covered by the Treaty. Both sides began portal monitoring in the summer of 1988.

It is clear from this exposition that the INF Treaty verification régime has borne out the utility of on-site inspection for verification purposes. However, it has also shown the limitations of on-site inspections. The INF régime does not permit "anytime, anywhere" inspections. The sides are limited to designated INF facilities. Likewise, the sides cannot carry out an inspection beyond the boundaries of a given facility. Accordingly, notwithstanding the benefits of on-site inspections, it will continue to be necessary to depend upon national technical means for verification of arms control agreements.

Efforts to Enhance Bilateral Verification

In addition to co-operative measures negotiated as part of arms control agreements, the United States has actively sought other methods of enhancing bilateral verification. In June 1989, for example, President Bush proposed a comprehensive package of verification and stability measures. His proposal called for the United States and the Soviet Union to undertake joint steps to provide greater military "transparency" in their relations, and to examine verification procedures that could facilitate negotiation of a new strategic offensive arms control agreement. This proposal led, in September 1989, to a United States–Soviet Agreement on Verification and Stability Measures providing for "pilot trials". The preamble to this Agreement states in part that it is designed "to achieve maximum confidence that the measures being negotiated . . . to verify compliance . . . will be both practical and sufficient for effective verification".

As a direct result of this Agreement, teams of United States and Soviet technical experts travelled to each other's countries in May and June of 1990 to witness proposed inspection procedures to enhance verification of strategic arms limitations. The procedures demonstrated by both sides involved means to distinguish heavy bomber aircraft carrying cruise missiles from bombers not so equipped, and to count the warheads on deployed intercontinental ballistic missiles and submarine-launched ballistic missiles. These trial verification efforts have directly contributed to the negotiation of effective on-site inspection procedures in the Strategic Arms Reduction Talks.

Conclusion

Even with multilateral or international arms control régimes, verification will remain a national prerogative. Each party to an arms control agreement must decide for itself the standards of evidence that would be required in determining whether another party is in compliance with the agreement. Indeed, the withdrawal clause included in most arms control agreements is invariably predicated on a determination that one's "supreme national interests" are in jeopardy. No nation is apt to allow an outside Power to determine for it whether its supreme interests are endangered by violations of an arms control agreement.

As for the United States, its position is clear. The United States will comply with all provisions of arms control agreements to which it is a party, and will insist upon like behaviour from the other signatories. From the United States perspective, effective verification is the means to this end.

Multilateral Verification: Opportunities and Constraints

Fred Bild and Peter Jones

The recently completed *Study on the Role of the United Nations in the Field of Verification*[1] undertaken by a Group of Experts has focused much-needed attention on the prospects for, and problems of, multilateral verification in the coming years. In discussing the subject, one should be aware of the different types of verification enterprises which could be entered into multilaterally. On the one hand, the task could be entrusted to a specific agency authorized to verify a given arms limitation and disarmament agreement—as is the case with the International Atomic Energy Agency and the Treaty on the Non-Proliferation of Nuclear Weapons. On the other hand, a general, "all-purpose" multilateral verification agency could be established to verify a wide variety of existing agreements and provide a ready infrastructure as new agreements are reached. Within these varying approaches to multilateral verification, there are, of course, many conceivable options for a United Nations role; indeed, the differences of opin-

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ion on this score played a prominent role in the Group's deliberations.*

The study itself came at a dramatic moment in history. While much of the public's attention in the Northern Hemisphere is currently focused upon the dramatic thaw between the super-Powers and the sweeping changes taking place in Europe, the renaissance of multilateralism is an equally impressive portent of things to come. Though it has obviously benefited from the warming of super-Power relations, this renaissance is primarily the result of a growing realization that certain interrelated problems facing the world community (such as the environment and under-development) can only be addressed on a global scale.

It was into this changing atmosphere that the Verification Study was launched in February 1988. The Study was carried out in pursuance of a resolution adopted by the General Assembly at its forty-third session, in 1988. In it the General Assembly called upon the Secretary-General to "undertake, with the assistance of a group of qualified governmental experts, an in-depth study of the role of the United Nations in the field of verification" that would:

> "a Identify and review existing activities of the United Nations in the field of verification of arms limitation and disarmament;
>
> "b Assess the need for improvements in existing activities as well as explore and identify possible additional activities, taking into account organizational, technical, operational, legal and financial aspects;

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*The Group was composed of experts from the following countries: Argentina, Brazil, Canada, China, Czechoslovakia, France, the German Democratic Republic, the Netherlands, Hungary, India, Japan, Kenya, Mexico, Nigeria, Sweden, the United Kingdom, the United States of America, the Union of Soviet Socialist Republics, Yugoslavia and Zaire.

"c Provide specific recommendations for future action by the United Nations in this context".[2]

It should be noted that those who were the strongest proponents of the study did not share a uniform approach to it. For Canada, France and the Netherlands, which played a leading role in the resolution that gave rise to the study, it represented an opportunity to address the woefully inadequate store of knowledge about multilateral verification. Canada had long been interested in this field of research, establishing within its Department of External Affairs a Verification Research Program dedicated exclusively to these issues. As part of its mandate, this Program had devoted considerable resources to the study of problems related to multilateral verification. It had thus been Canadian policy throughout the 1980s to foster research into various aspects of verification, and the proposed study was regarded as an example of this policy.

Others, most notably several nations associated with what was once known as the Six Nation Initiative, saw the study as an opportunity to push for the creation of a United Nations verification body. Proponents of this view reasoned that such an agency would provide expert training in verification techniques for the nations not now engaged in verification or familiar with the techniques involved. They also believed that a standing agency would provide a degree of impetus to conclude treaties on arms limitation and disarmament and might well remove any grounds for arguing that such treaties would not be verifiable. For these and other reasons, these nations also proposed a study, but one oriented towards specific recommendations about activities which could be undertaken by the United Nations.

Still others were not pleased at the idea of any study. Though most of them would eventually vote for the resolution establishing it, they feared that the study would become an exercise in the advocacy of a standing, all-encompassing verification agency. Such a development, they argued, would run counter to the view that verification was a treaty-specific exercise, and that the combination of techniques and capabilities employed under each individual agreement must be the product of negotiation and agreement by those States that would be parties to the agreement.

Though Canada shared these concerns, and firmly subscribed to the view that verification arrangements should be treaty-specific, it still believed that a study need not prejudge the answers to these questions. Moreover, in attempting to fill the huge gap in knowledge on the subject, the study could well provide new approaches. The idea that everyone would bring to the study a politically neutral agenda, with nothing more than an objective desire to explore the issues, was, perhaps, too optimistic.

At the first of the Group's four sessions, in February of 1989,* it became obvious that the debate over whether to recommend the establishment of a standing United Nations verification body would be the most difficult issue to resolve. Before tackling this question head-on, however, the Group decided to explore the generic verification issues. With the help of a consultant, Michael Krepon,** the Group drafted and re-drafted several descriptive chapters dealing with the specifics of verification.

Most readers of the report will naturally be tempted to begin with a glance at the conclusions. They would be making a grave mistake, however, if they were to ignore the chapters which precede the conclusions. In many respects, these first chapters may well prove to have been the

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* The Study Group met four times: 13 to 17 February 1989; 24 July to 4 August 1989; 8 to 19 January 1990; and 2 to 13 July 1990.

** Mr. Krepon is President of the Henry L. Stimpson Institute, a private think-tank on verification and other issues, based in Washington, D.C.

Group's greatest achievement. Long after the dust has settled on the political questions whether this or that recommendation should be acted upon and how, the existence of an agreed descriptive survey of this complex issue will provide a firm basis for constructive discussion and, perhaps, for new initiatives.

The extent to which such an agreed survey of terms and concepts was lacking is reflected in the difficulty which the Group experienced in settling upon a working definition of the term "verification"; indeed it was unable to reach agreement on this fundamental definition until well into the final session. The problem, of course, is that verification is at once easily understood in the broad sense, but difficult to pin down conceptually as one moves from the general to the specific. While few would argue with the definition in the *Concise Oxford Dictionary*: "... the process or an instance of establishing the truth or validity of something", the term as applied to arms limitation and disarmament agreements requires more elaboration if it is to be useful.

A good many definitions of verification, as applied to the arms limitation and disarmament process, have been put forward over the years.[3] As a general rule, these definitions have all emphasized at least two characteristics: first, that verification is a process, rather than a static concept; and second, that this process involves some degree of political judgement as to whether or not an obligation is being fulfilled. This political judgement is usually based largely upon information collected about the weapons in question, but the fundamental biases and political concerns of the party doing the verifying are never entirely absent. Hence the Group's agreed definition:

> Verification is a process which establishes whether the States parties are complying with their obligations under an agreement. The process includes: the collection of information relevant to ob-

> ligations under arms limitation and disarmament agreements; the analysis of the information; and reaching a judgement as to whether the specific terms of an agreement are being met. The context in which verification takes place is that of the sovereign right of States to conclude and their obligation to implement arms limitation and disarmament agreements. Verification is conducted by the parties to an agreement, or by an organization at their request.[4]

Not surprisingly, given the difficulties which the Group experienced in coming to this definition, the remainder of the descriptive/analytical chapters could also not be agreed upon until the final session. To a large extent the Group's difficulties with definitions and descriptions of generic concepts emanated from its differences over the types of recommendations which should be included in the final chapter.

One can imagine two major focuses of the recommendations made in the study. One type of recommendation could have been oriented largely towards using the offices of the United Nations as an equalizer of opportunities between rich and poor nations in the field of verification. Activities undertaken in this field would aim to provide nationals of less developed countries with practical assistance and advice on the wide range of complex technologies and methodologies which have been employed in the field of verification to date. The second type of recommendation could have been mainly devoted to having the United Nations actually conduct verification activities. Such recommendations would require the acquisition by the United Nations of sophisticated and expensive equipment, and the training of a multinational staff to operate and maintain these devices. It should be noted that the second type of recommendation would necessarily have started the United Nations on the path to a standing multilateral verification agency. The first type of recommendation, on the other hand, would lead to a situation of potential benefit not only to those who favour such an agency, but also to those who favour a treaty-specific approach to the creation of multilateral verification organizations.

The Study Group carefully examined all of the potential recommendations that could have been made. In the first area, it concluded that there was a serious need for a central repository of information on verification. All too often, researchers and officials in various countries (primarily those which have not dealt first-hand with verification) have difficulty in acquiring either technical or methodological studies which are widely available in other parts of the world. It was agreed that the existence of a central data bank on verification issues, featuring a computerized index and an on-line information retrieval system, would do much to ease the difficulties experienced in many parts of the world by those interested in verification.

Following on from the idea of a data bank, the Group considered the prospects for, and possible benefits of, using the United Nations to promote exchanges between experts and officials. The Group agreed that such exchanges would be of value to both the diplomats and the experts. Experts could help diplomats to define solutions to problems faced at the negotiating table, while the diplomats could assist the experts in focusing their work on those areas most in need of intensive research.

These two recommendations of the Group imply that the United Nations would take an active role in facilitating the dissemination of knowledge and the spread of expertise. The United Nations, however, would not necessarily become involved in actual verification activities *per se*. Such activities were discussed at length by the Group. In the discussion two themes emerged: the first revolved around the technologies which the United Nations would have to acquire, while the second concerned the proper administrative structure for a potentially operational United Nations involvement in verification. The Group did not, in the end, recommend United Nations involvement in those areas, for the time being. The discussions were quite detailed, however, and are fully reflected in the report.

In the case of the technologies, it was widely recognized that United Nations access to sophisticated overhead imaging would be especially important if the United Nations were to have the ability to move into a variety of areas on short notice and perform essential verification tasks. There are, at present, two types of overhead imaging systems available: aircraft and satellites. In both cases, considerable expense would be involved in the acquisition of the necessary hardware, information processing and imagery analysis equipment, not to mention the employment and training of operators. Moreover, there was some question as to whether the capabilities of available commercial satellite imaging systems were sufficient for a wide range of verification-related activities.[5]

The expense and organizational upheavals associated with the acquisition by the United Nations of such complex systems would probably lead to the creation of some sort of United Nations monitoring organization. The numbers of staff required to maintain and operate the equipment and to analyse its output would vary, depending upon the agreed requirements of whatever organization might be established. At a minimum, however, a certain cadre of trained officials and technicians would have to be kept on the strength permanently. Herein lay the seeds of the greatest problem which many Group members had with the idea of establishing a permanent verification agency: In the absence of anything to verify, what would these people do? The fundamental question here relates to the subject of treaty-specificity and the premise that an agency should not be created unless it had agreed, specific treaty-based tasks.

It might therefore appear at first glance that the Group recommended that the United Nations undertake activities exclusively along the line of disseminating information, while being unable to agree on any actual, hands-on verification initiatives; in short, that the United Nations assist those studying verification, but that it should not verify anything itself. Upon closer examination, however, the third of the Group's recommendations constitutes an attempt to bridge the gap between the two types of activity.

As the report points out,

> "... the experience gained from the Secretary-General's fact-finding activities could be helpful in connection with certain arms limitation and disarmament agreements that lack explicit verification provisions".[6]

By advocating that the Secretary-General's capabilities in this area be "broadened", or that the means by which existing capabilities are carried out be "expanded", the Group recognized that the United Nations Secretariat already plays an important role in contributing to the verification of certain types of arms limitation and disarmament agreements. Of course, as the Group noted, the Secretary-General should only engage in these activities when given a specific mandate to do so and nothing should interfere with his flexibility in this regard. The Group recommended a specific example of an agreement which could benefit from the expansion of the Secretary-General's fact-finding mandate, should the adherents to the treaty agree.[7]

Thus, the report is not devoid of consensus recommendations calling for an expansion of the role of the United Nations in actually verifying arms limitation and disarmament agreements. Moreover, the enthusiastic and thorough implementation of the consensus recommendations could well lead to the creation of circumstances in which the United Nations could develop, over time, the ability to adopt a more active role in verifying agreements. One could imagine, for example, that a series of practical workshops in various technical aspects of verification would, eventually, bring into being a cadre of appropriately trained technicians from several countries. Such workshops could be conducted under the auspices of the Group's second recommendation. Should a United Nations verification body be established in response to the terms of a specific future arms limitation and disarmament agreement which requested that the United Nations assist in its verification, those trained individuals could fill its ranks quickly. One must bear in mind, however, that, as the Group itself concluded:

> "The development of a United Nations verification organization must be seen as an evolutionary process."[8]

On the whole, the Group's recommendations represent the most ambitious agenda for United Nations action that could achieve consensus at this time. The recommendations provide a clear outline for immediate action, on the part both of the United Nations Secretariat and of the individual Member States. Indeed, it should be stressed that the speedy implementation of these recommendations will require of individual Members concrete actions in support of the Secretariat. The compilation and indexation of materials for the verification data bank, for example, would be achieved quite readily if those Member States possessing data banks or computer indexes were to make these available to the Secretariat. Canada, among others, has already pledged such co-operation.

Conclusion

In these times of rapid shifts in the uses of military power, as some threats wane while new ones arise, there is a need for continued efforts in arms limitation and for adapting negotiation and verification processes to ever changing circumstances. There is also an urgent need for a greater concentration of the world's resources on environmental and developmental issues. Fortunately, encouraging trends are emerging. Arms control and even disarmament treaties are being signed by the major military Powers. This process can only be expected to intensify as their military spending is reduced from the high levels of the post-war period.

As many nations look to arms limitation and disarmament treaties with their former adversaries to play an increasing role in their security policies, there will be a growing need to ensure that these treaties are being observed. One must recognize that, until recently, some treaties on arms limitation and disarmament made only cosmetic cuts in military forces, or merely capped existing levels of armaments, or even sanctioned certain types of increases. In such an environment it was sometimes perceived that compliance was of less importance to national security, given the tremendous redundancy of weapons which such agreements left available, than it was to the creation of an environment of political trust between the signatories.

Today, with some military forces decreasing, in absolute and relative terms, countries are developing new attitudes towards verification. Where both sides had previously used exaggerated verification demands as pretexts for stalling negotiations, they now have to reckon with the other side's saying "Yes". On-site inspection, for example, had been an absolute non-starter in verification negotiations for many years. It was thus easy simply to call for blanket on-site inspection provisions in the full knowledge that the other side would reject them. Today, in the wake of the Stockholm Document of 1986 and the 1988 Treaty between the United States and the Soviet Union on the

Elimination of Their Intermediate-Range and Shorter-Range Missiles—the INF Treaty—both sides must rigorously weigh the costs and benefits of granting full on-site inspections to the other side, before calling for such rights themselves. As what was once the stuff of propaganda becomes the substance of actual arms limitation and disarmament treaties, new attitudes are emerging. It may well be that a less costly, multilateral approach will find increasing favour over time.[9]

Moreover, the potential usefulness of verification techniques and methods developed in the arms limitation and disarmament area are not limited to these types of agreements. One can imagine, for example, a future treaty to reduce transboundary emissions of various pollutants requiring some sort of verification régime. Indeed, all sorts of international agreements aimed at tackling various environmental problems may require co-operatively run monitoring régimes.

In other areas, as States come to rely more on co-operative actions for their security needs, there will be a growing demand for disengagement observer forces. Though not verification as such, the techniques involved are similar. One could cite many other examples, all of them stressing the importance of verification techniques as a tool for reducing tensions and allowing negotiations to proceed. In this sense, the report of the Group of Experts makes a significant contribution. It recognizes the growing importance of multilateral verification and outlines an immediate and practical role for the United Nations to play in the field.

In summary, three major considerations emerge from the report. First, the successful implementation of the Group's recommendations depends on the will of the Member States to take the necessary actions. Success will also largely be a function of the extent to which the multilateral process of arms limitation and disarmament takes fully and realistically into account the services the United Nations could provide.

Secondly, Member States must display a willingness to apply the lessons being learned in those areas of the world where tensions are being successfully reduced to regions in which the threat of conflict remains high. The recent advances in arms limitation and disarmament have thus far, unfortunately, been limited almost exclusively to the East/West context. Indeed, as we write, the prospects for regional conflicts are growing in other areas of the world, rather than decreasing. If multilateral verification techniques are to be useful in more than agreements between super-Powers and their alliances, arms limitation and disarmament measures must be applied to regional tensions everywhere.

Thirdly, multilateral verification techniques should be examined in contexts beyond those of arms limitation and disarmament agreements. As Member States come to recognize, for example, that their security, indeed their survival, depends as much on a healthy environment as on the absence of war, they will want to negotiate international agreements for the protection of the natural environment and resources. Compliance with such agreements will likely require verification provisions similar to those found in treaties on arms limitation and disarmament. The support which the Study gives to various forms of generic research into verification could thus play a vital role in multilateral co-operation in areas beyond arms limitation and disarmament if the will and imagination exist to use the knowledge gained in non-traditional ways.

Notes

1 United Nations, "Study on the Role of the United Nations in the Field of Verification" (General Assembly document A/45/372, 28 August 1990).

2 General Assembly resolution 43/81 B of 7 December 1988.

3 For representative examples, see S. W. Cheong and N. M. Fraser, "Arms Control Verification: An Introduction and Literature Survey" in *Arms Control*, vol. 9, No. 1 (May 1988). See especially pp. 38-40.

4 A/45/372, para. 12.

5 *Ibid.*, paras. 235-237.

6 *Ibid.* para. 271.

7 *Ibid.*, paras. 271-272.

8 *Ibid.*, para. 276.

9 See, for example: B. W. Henderson, "Arms Control Pacts May Outpace Advances in Verification Technology", *Aviation Week and Space Technology*, 6 August 1990, pp. 51-52, 56; J. D. Morrocco, "Verification Raises Cost, Technology Concerns", *ibid.*, pp. 44-45, 48. For a thoughtful article on the direction in which things may be going, see I. Oerlich, "The Changing Rules of Arms Control Verification", *International Security*, vol. 14, No. 4 (Spring 1990), pp. 176-184.

Amendment Conference to the Partial Test-Ban Treaty

Raising the Visibility of the Comprehensive Test-Ban Issue

Miguel Marín-Bosch

"A guaranteed end to all nuclear testing in all environments is a fundamental objective of the free world. We are deeply convinced that the achievement of this objective would serve our best national interests and the national interests of all the nations of the world."

Thus President Kennedy and Prime Minister Macmillan began their joint statement of 27 August 1962. That same day, in the recently established Eighteen-Nation Committee on Disarmament (ENDC) in Geneva, the representatives of the United States and the United Kingdom jointly submitted alternative draft treaties. The first banned "all nuclear weapon tests in all environments for all time" and contemplated an international verification system.[1] The second banned tests in the atmosphere, outer space and under water without verification.[2] A year later a partial test ban based on the second draft was signed in Moscow.

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An "Amendable" Partial Test Ban

The Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water was signed on 5 August 1963 by the USSR, the United Kingdom and the United States of America, the original parties to the Treaty. Known as the Moscow or partial-test-ban Treaty (PTBT), it entered into force on 10 October of that year. Today there are 117 States parties to the Treaty.

The Treaty is of unlimited duration and is one of the pillars of the nuclear disarmament edifice which the international community has been building in the second half of the twentieth century. Although China and France continued nuclear testing in the atmosphere until the late 1970s, today no one—whether a party to the Treaty or not—would dare to do so. Therein lies the not insignificant value of the PTBT.

The PTBT is a treaty with few provisions. It has but five articles. Article I bans nuclear-weapon tests in the atmosphere, in outer space, or under water and also prohibits any underground nuclear test if "such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted".

Article II deals with the procedure for amendment of the Treaty and articles III to V contain the usual provisions regarding such matters as ratification, entry into force, registry, duration and withdrawal. Of these provisions, the one concerning withdrawal was considered important in 1963.

What is the origin of article II of the Treaty? The PTBT was based on the partial test-ban draft submitted on 27 August 1962 by the United Kingdom and the United States. The other draft which they put forward that day—the one calling for a comprehensive test ban (CTB)—included provisions for the establishment of an international scientific commission which was to be responsible for verification of the treaty and which was to meet once a year to review its operation and, should the need arise, to approve amendments. Since the partial test-ban draft did not contain a similar provision, the co-sponsors added an article on amendments calling for the convening of an amendment conference upon the request of one third or more of the parties. For an amendment to be approved, it had to obtain two thirds of the votes of the parties, including all three original parties. On the other hand, the draft permitted nuclear explosions for peaceful purposes since, at that time, the United States Atomic Energy Commission had embarked on an ambitious programme called Plowshare. However, in 1963, at the request of the USSR, the provision on peaceful explosions was eliminated. The United Kingdom and the United States requested, in turn, that the majority required for approval of an amendment be reduced from two thirds to a simple majority, including the original parties. They felt that in that way it would be easier to amend the treaty in order to permit such explosions in the future.

It could therefore be said that the two substantive provisions of the Treaty are the partial ban of nuclear tests and the possibility of amending it. The idea of amending or extending the partial test-ban Treaty to include underground tests has been put forward in the past by both the United States and the Soviet Union. On 27 January 1966, United States President Johnson stated that the United States

> "persists in its belief that the perils of proliferation would be materially reduced by an extension of the limited test ban Treaty to cover underground nuclear tests".[3]

On 14 December 1967 the USSR representative stated in the First Committee of the General Assembly:

> ". . . We are ready at any time to negotiate the extension of the 1963 Moscow Treaty Banning Nuclear

> Weapon Tests in the Atmosphere, in Outer Space and under Water to underground tests, thereby making the Treaty all-embracing."[4]

Three Decades of Patience

In its day, almost thirty years ago, the PTBT was proclaimed a significant first step in the field of nuclear disarmament. However, upon signing the Treaty, the United States Secretary of State pointed out that

> "it is not yet possible for us to guarantee now what the significance of this act will be. History will eventually record how we deal with the unfinished business of peace".[5]

One should also recall the words of the United Kingdom representative on 30 July 1963, a few days before the Treaty was signed:

> "I hope too that we shall put this partial test ban treaty, welcome as it is, in its proper perspective. Clearly it will not in itself reduce armaments. Moreover, it may not necessarily prevent the proliferation of nuclear weapons. On the other hand, it would be a significant first step in those directions."[6]

If, in 1991, we try to "put the Treaty in its proper perspective", we reach a rather different conclusion as to its value. What history has recorded over the last 27 years is an unbridled nuclear-arms race. In the 1963 Moscow Treaty the USSR, the United Kingdom and the United States proclaimed themselves "determined to continue negotiations" aimed at achieving "the discontinuance of all test explosions of nuclear weapons for all time", a pledge they reiterated in the 1968 non-proliferation Treaty (NPT). Between 1945 and 5 August 1963, those three States had carried out an average of 30 tests per year. Since 1963 the average has been over 40 tests a year. Since 1963 the Conference on Disarmament in Geneva has not been able to move forward substantially in the drafting of a multilateral agreement banning all nuclear-weapon tests.

We are often told that the 1974 threshold test-ban Treaty (TTBT) between the USSR and the United States is a measure aimed at reducing underground tests, but the Moscow Treaty does not—nor does the NPT—speak of a *partial* ban on underground testing. It does not speak either of limiting those tests to a certain threshold or, even less, of a 150-kiloton limit or threshold, or of "reducing to a minimum" those tests. Moreover, the threshold agreed on in the TTBT is equivalent to over ten times the explosive power of the bomb that destroyed Hiroshima in 1945.

Until 1963, the strategic nuclear arsenals of the super-Powers included, above all, a fleet of long-range heavy bombers, as well as some intercontinental ballistic missiles (ICBMs) and sea-launched ballistic missiles (SLBMs). Today those arsenals include, above all, ICBMs, SLBMs, cruise missiles, intermediate- and short-range ballistic missiles, and some bombers. The increase in the destructive power of those arsenals has kept pace with their qualitative advances.

Twenty-seven years ago the United Kingdom and the United States were ready to ban for ever *all* nuclear-weapon tests if that ban contemplated an international verification system. The USSR appears ready today to accept an international verification system that includes on-site inspections. Why, then, is it not possible to reach an agreement? Because the United Kingdom and the United States, together with their allies in the North Atlantic Treaty Organization (NATO), resort today to the same arguments of thirty years ago, except that they use them for completely opposite purposes. In 1962 they said that a comprehensive test ban was "the key to disarmament", since it would be "an important first step in bringing the arms race under control". In other words, a test ban would stop the development and improvement of nuclear arsenals. Today they tell us that a comprehensive test ban "would be premature, and perhaps even destabilizing", since their security depends on deterrence based on the possession of nuclear weapons and that means continued underground nuclear testing to ensure that such weapons remain effective and up to date.

The political and ideological transformation that is occurring in Europe is, in turn, transforming NATO's military doctrines, the central element of which has for decades been the deterrent power of nuclear arsenals. That deterrent power—if it ever was of value in the past—no longer makes sense in a Europe very different from that of 1945. Who is to be deterred with nuclear weapons in the 1990s? It is obvious that the military leaders in both Washington and Moscow, and thus in London and even Paris and Beijing, will have to change their view of the world, adapting it to the new realities, and they will also have to change the role they assign to nuclear weapons in their respective defence doctrines.

If there really is a will to follow the path towards genuine nuclear disarmament, we must begin where we left off in 1963, namely, by shutting the door on the vertical proliferation of nuclear arsenals. And to do so we must ban *all* nuclear-weapon tests. There is no point in reducing certain types of weapons if, at the same time, others are developed and improved. Moreover, what is the sense of removing nuclear warheads from one region of the globe if later they are going to appear in another? There is no sense in exchanging land-based weapons for sea-launched or air-launched ballistic missiles. What is occurring today is rather a re-deployment of weapons, a redistribution—the weapons are still there. This might have a positive, momentary impact on public opinion, especially in Europe, but it cannot be seen as a genuine disarmament measure.

Underground, Out of Sight and Out of Mind?

The history of the negotiations aimed at a complete ban on all nuclear tests is one of squandered opportunities. Imaginative proposals have been put forward to bridge the perceived differences between the super-Powers, and the technical aspects of verification have been thoroughly studied. And yet, nuclear testing continues. What has been lacking is the political will to reach an agreement, and the lead must come from Washington and Moscow.

It is true that year after year the United Nations General Assembly has called on the nuclear-testing States to conclude a comprehensive test-ban treaty. In fact, it has adopted over 70 resolutions on this item alone and it is quite evident that the overwhelming majority of nations would welcome such a treaty. But it is also true that those nations have not exercised fully their political leverage. Moreover, the public in many countries either has lost interest in the test-ban issue or has shifted its attention to other, apparently more pressing, questions. The fact is that, since testing went underground and the photographs of nuclear mushrooms of atmospheric blasts disappeared from the newspapers, the issue has not aroused public opinion as it did in the late 1950s and early 1960s. And in the Conference on Disarmament in Geneva, whose work in 1962 began with a flurry of publicity and the personal involvement of the leaders of the United States, the United Kingdom and the USSR, the issue has slowly been buried in the soporific confines of the Council Chamber of the Palais des Nations.

In recent years the issue of a comprehensive test-ban treaty has gained increasing visibility. In 1986 the Heads of State or Government of Argentina, Greece, India, Mexico, Sweden and the United Republic of Tanzania underscored the urgency of achieving a comprehensive test-ban treaty and offered their good offices for the establishment of a verification system. On the other hand, the USSR's moratoriums on testing have led some analysts to question the need for further testing by others. At last year's Fourth Review Conference of the Non-Proliferation Treaty the issue figured prominently, especially in the light of the fact that in 1995 a decision will be taken regarding extension of the NPT. A comprehensive treaty has also been at the centre of discussions concerning the importance of laying the groundwork for a truly universal and genuine non-proliferation régime. Moreover, a group of non-governmental organizations, headed by Parliamentarians for Global Action, has also been advocating a comprehensive treaty and in 1985 suggested that parties to the Moscow Treaty avail themselves of the provisions of the Treaty by calling for an amendment conference aimed at converting it into a comprehensive treaty. The United Nations General Assembly endorsed the idea, hence the decision of Indonesia, Mexico, Peru, Sri Lanka, Venezuela and Yugoslavia in 1988 to submit a proposal for amendment.

Upon the request of one third of the States parties, the Amendment Conference was convened, but it was not easy. The depositary Governments at first arrogated to themselves the right to decide how, when and where to hold the Amendment Conference. According to recognized international practice, the depositaries should have limited their role to carrying out their obligation to inform the other parties of that request and to act impartially. It was up to the parties as a whole to take the decisions regarding the organization and preparatory work of the Conference. That was achieved at the Meeting of the States Parties for the Organization of the Amendment Conference, held in New York from 29 May to 8 June 1990, in accordance with United Nations General Assembly resolution 44/106 of 15 December 1989. That session of the Conference was followed by a one-week session from 4 to 8 June and a substantive session, held from 7 to 18 January 1991.

The principal purpose of the Amendment Conference is to convert the partial test-ban Treaty into a *comprehensive* test-ban treaty. The amendment to the Treaty proposed by the six nations that initiated the process consists of three parts: first, the addition of a new article VI providing that

> "The protocols annexed to the present Treaty constitute an integral part of the Treaty";

secondly, the text of a "Protocol I", which would ban underground nuclear tests; and thirdly, a draft "Protocol II" on the verification of the proposed comprehensive test ban.[7]

Given the attitude of two of the depositaries, it was obvious that the amendment would not be adopted. But the broad-ranging general debate and the discussion of the verification protocol, together with the participation of non-governmental organizations, served to underline the widespread international support for a comprehensive treaty. The General Assembly was fully conscious of this situation when it recommended, in its resolution 45/50 of 4 December 1990, "that arrangements be made to ensure that intensive efforts continue, under the auspices of the Amendment Conference, until a comprehensive nuclear-test-ban treaty is achieved".

The vast majority of the parties thus sought agreement on a follow-up mechanism that would allow the Conference to continue its work after 18 January. The six initiators, together with Nigeria, the Philippines, Senegal and the United Republic of Tanzania, submitted a draft decision to this effect:

> Acknowledging the complex nature of certain aspects of a comprehensive test ban, especially those with regard to verification of compliance and possible sanctions against non-compliance, the States Parties were of the view that further work needed to be undertaken. Accordingly, they agreed to reconvene the Conference no later than September 1993

> and to establish an intersessional working group, composed of 15 to 20 countries, in order to continue the consideration of verification of compliance of a comprehensive test-ban treaty. The working group will submit a report to the Conference at its reconvened session.

Later, in a spirit of compromise, they amended their proposal to read:

> Accordingly, they agreed to mandate the President of the Conference to conduct consultations with a view to achieving progress on those issues and resuming the work of the Conference at an appropriate time.

That was the text of the decision adopted on 18 January by the Conference by 74 votes to 2 (United Kingdom and United States), with 19 abstentions. All of the non-aligned countries supported the decision, as did one of the depositaries (USSR) and a number of countries from the Group of Western European and Other States (Australia, Denmark, Iceland, Ireland, New Zealand, Norway and Sweden).

The President of the Conference, Foreign Minister Ali Alatas of Indonesia, will now have to continue his skilful handling of the work of the Conference. However, to fulfil his mandate, he will have to receive the active support of the parties to the partial-test-ban Treaty. The consultations he will conduct and the future sessions of the Conference must be seen also in the context of the evolution of world public opinion regarding a comprehensive test-ban treaty. Moreover, a comprehensive test ban should be considered one of the key elements in a series of measures to be implemented in the coming years in order to ensure that the international community enters the next century with a real vertical as well as a horizontal non-proliferation régime. One important aspect of that future régime will be the system for verifying compliance with a comprehensive test-ban treaty; another should be the sanctions that may result from non-compliance.

The Amendment Conference should thus be seen as part of a wider process. It should be seen against the background of what happens (or does not happen) in the Conference on Disarmament in Geneva and of the repeated appeals made in this regard by the General Assembly, the Secretary-General of the United Nations and the international community in general. The Conference should also be placed on a parallel track with the 1995 extension conference on the non-proliferation Treaty. Over the next five years there will necessarily be a collective review of the present nuclear non-proliferation régime in order to identify measures aimed at enhancing the possibilities of extending the non-proliferation Treaty well beyond 1995. For many countries the Amendment Conference is a central element in that collective review.

Notes

1 Document ENDC/58 of the Eighteen-Nation Disarmament Committee.

2 Document ENDC/59 of the Eighteen-Nation Disarmament Committee.

3 Document ENDC/165 of the Eighteen-Nation Disarmament Committee, point 4.

4 *Official Records of the General Assembly, Twenty-second Session, First Committee*, 1551st meeting, para. 161.

5 Document ENDC/PV.150 of the Eighteen-Nation Disarmament Committee, p. 5.

6 Document ENDC/PV.148 of the Eighteen-Nation Disarmament Committee, p. 16.

7 Documents PTBT/CONF.8/6 and Add. 1.

Towards the Third Biological Weapons Convention Review Conference

The Potential Threat of Biological and Toxin Weapons

Esmat A. Ezz

Introduction

Biological warfare may be defined as the deliberate use of living organisms and viruses or of their poisonous products to induce death or disease in man, animals or plants. The biological warfare agents depend for their effect upon their ability to multiply in the organism attacked. In the past biological and toxin warfare agents have been considered to have only limited military importance. As late as 1978, United States President Jimmy Carter stated

> "that such agents can only create serious problems for the user, that they will be indiscriminate in their application, ineffective as weapons of combat and they cannot be controlled. Under these conditions there is a very strong chance that they might cause as much harm to the user as the intended adversaries".[1]

The development and production of biological weapons is a major undertaking, one which requires great technical resources and expenditures for the initial studies, for the development and production of biological agents and for the special weapon systems needed for their deliv-

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ery. The manufacture of most putative biological weapon agents, especially of viral biological weapon agents, poses serious safety problems. In the joint background paper presented to the First Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction—the biological weapons Convention—by the depository Governments, the formidable safety requirements for any bacteriological weapon development actively involving pathogenic agents were clearly recognized.[2]

Nevertheless, such weapons might be simpler and less expensive to produce than other weapons of mass destruction. Some countries with limited technical competence could become involved in the production of biological materials, using widely available technologies, without the proper safety and security measures.

Toxins, which are agents that cannot reproduce on their own can cause death or disease within minutes or hours. They have low stability when exposed to heat, surface pressure and oxidation. Attempts to use solid toxins for weapons purposes have encountered serious difficulties as regards maintaining agent stability during and after release and as regards achieving efficient aerosolization. For these reasons besides the difficulty of manufacturing them and the cost involved, no country is known to possess toxin weapons or to have developed battlefield weapons based on toxins that would be competitive with chemical weapons.[3]

The Role of Gene Technology

The possible ramifications of genetic engineering on the efficiency of biological weapon agents is very controversial. In 1981, an expert panel convened by the United States Department of State concluded that "genetic engineering will not yield pathogens that are any more lethal than some that already exist (e.g. anthrax)".[4] Martin Kaplan and others maintain that the use of genetic engineering to fabricate new types of horrible biological weapons is science fiction and beyond the realm of possibility. He also claims that a genetically engineered organism is weak and cannot survive in an atmosphere in which it would be in competition with normal microbes.[5] On the other hand, Erhard Geissler and others claim that genetic technology increases the efficiency of putative biological and toxin weapon agents and can interfere with a potential enemy's protection. It can also enhance the ability to protect forces utilizing biological and toxin weapons. He also claims it can provide the means for mass production, efficiency of dissemination, and low persistence after delivery.

How Bacteriological (Biological) Warfare Agents Differ from Other Warfare Agents of Mass Destruction

Biological warfare agents have certain features which make them different from any other warfare agents of mass destruction. These relate to the nature, duration and extent of the possible threat they pose to human beings.

First, biological weapon agents are characterized by the extremely small amount of the agent that is sufficient to induce infection and by the variety of agents which could suit various tactical situations as regards the onset of their effect, the duration of their action and the question whether the intention is to produce incapacitation or death.

Secondly, most biological warfare agents are living organisms which threaten to produce and spread epidemics. Unintentional contamination is of particular concern. If the strictest safety measures are not observed or if they prove inadequte, biological warfare agents might, it is feared, be released during their development, production, storage or transport. If the persons involved in the development and production of the biological warfare agents were technically or scientifically inexperienced or conducted these activities carelessly outside so-called "high-risk" research centres or "maximum containment laboratories", the chance for unintentional contamination could increase.

Such practices could involve the danger of spreading epidemics, not only in the country involved, but also in adjacent countries and even all over the world. The problem could get out of control if a country was experimenting with genetic engineering and producing organisms whose characteristics had been changed. It might then become difficult to diagnose them and to prevent them from becoming a possible threat. Such practices go beyond a country's right to freedom of action since they threaten the safety and security of other countries and indeed of the whole world.

Strangely enough, in such a situation, the threat or danger of the spread of biological agents to other countries could not be considered a violation of the Geneva Protocol of 1925 inasmuch as it would not occur during the actual aggressive use of such weapons. Prohibition of the development and production of such weapons is therefore a matter of legitimate concern for the world community at large and could be achieved only under the provisions of the biological weapons Convention—hence also the importance of universal adherence to this Convention and of strict observance of its provisions. Even one irresponsible country outside the Convention, once involved in such practices, could constitute a real threat to every country in the world.

The third feature is that—unlike chemical and nuclear warfare agents, which are artificially produced—biological agents have always existed and have always caused and will continue to cause diseases and epidemics. Therefore they have been of great concern and will continue to be so. Research into methods of combating and controlling them has been going on for many years and should continue. Because these agents do not respect national boundaries and therefore constitute a threat to the health of human beings everywhere, global co-operative efforts are needed to combat them. Research work on biological agents for peaceful and humanitarian purposes such as diagnosis, protection, decontamination, control and treatment should be shared with all nations and should be developed without commercial exclusivity. In this they differ from chemical and nuclear warfare agents, the introduction and production of which have involved certain industrial technologies and trade secrets that have to be guarded. This fact has indeed been an obstacle in the way of verification of the non-production of chemical weapons, and has been considered in the ongoing negotiations on the chemical weapons convention. If the world community agreed that research in the field of microbiology should not in any way be directed towards military objectives, then there would be no military secrets to hide. At the same time, if it is agreed that there should be no monopoly on the results of research work intended to fight diseases and epidemics producing micro-organisms—which do not respect national borders—there would be no trade secrets to guard or illicit activities to hide. If this is generally accepted, there should be no objection to on-site inspection and the exchange of visits and information between centres and scientists. Verification of compliance with the provisions of the biological weapons Convention would be much easier if countries adhered to it in good faith and really had nothing to hide.

Is the Biological Weapons Convention Weak?

Some analysts consider that the biological weapons Convention suffers from several weaknesses. First, it does not restrict research on potential biological weapons and toxic weapons agents; secondly, it allows the development, production and stockpiling of potential biological and toxic agents for prophylactic, protective and other peaceful purposes and does not limit the types and quantities of these agents; and thirdly, it lacks provisions with regard to verification.

To the first point, it may be said that if these organisms are present in the environment, it is important to conduct research on them in order to have a better understanding of their characteristics and of means to combat them and prevent epidemics. The fact that they are potential warfare agents does not prevent work on protection and treatment even after we have achieved universal adherence to the biological weapons Convention. What should be prohibited is work aimed at increasing the virulence and stability of the organisms or at improving their utility in the field.

To the second point, it may be said that in order to conduct research, it is necessary to have enough material to work with, but that the quantities produced should not exceed the capacity of the specific research centre. As to the types of organisms to be investigated, one cannot say that each country should work only on organisms that are present in its environment or that could threaten public health in a given country. That would not be practical and might even be harmful. It is true that some diseases are indigenous to certain parts of the world, but because of the continuous and fast movement of people and goods all over the world the spread of diseases could be global. Therefore, countries which have the facilities and scientists necessary to conduct research on their own problems and on those of others should do so, provided that the work is not secret and the results are declared and the research facility is open to scientific inspections.

As regards the third point, the verification provisions contained in the Convention are limited to article V under which States parties agree to consult one another and to co-operate in solving any problems, and under article VI, in which States parties undertake to co-operate in carrying out any investigation which the United Nations Security Council may initiate in response to a complaint submitted to it. At the First Review Conference, it was agreed that any State party might request a consultative meeting of experts to deal with problems that might arise. This could permit resolution of political problems at the technical level. Again, the issue of effective verification had dominated the discussions at the Second Review Conference, held in 1986. The Conference agreed on a number of measures to eliminate or reduce doubts and suspicions, including (*a*) exchange of data on "high risk" research centres and laboratories; (*b*) exchange of information on outbreaks of infectious diseases; (*c*) encouragement of publication of results of biological research; and (*d*) promotion of contacts between scientists. The Conference also agreed that an *ad hoc* meeting of scientific and technical experts from States parties would be held in Geneva to finalize the modalities for the exchange of information and data. The first such meeting was held from 31 March to 15 April 1987. Three rounds of information exchange have taken place. The information and data collected were reported, as agreed upon in the Conference, to the Department for Disarmament Affairs of the United Nations Secretariat, for transmission to all States parties.

Strengthening the Biological Weapons Convention

Nowadays, co-operation between the two major Powers has replaced confrontation. The dramatic changes in the international atmosphere are most encouraging and have contributed to great accomplishments in the area of disarmament. The sensational agreements regarding verification with regard to nuclear and chemical weapons are hopeful signs that mankind not only could get rid of the weapons of mass destruction that have been threatening its survival, but could also look forward to an era of peace and security. The nations of the world need to join hands in efforts to strengthen confidence-building measures and to realize the value of openness and mutual trust as factors in ensuring stability in international relations. This tends to improve the prospects for strengthening the biological weapons Convention and to reduce the doubts with regard to verification. This could be achieved through more openness, comprehensive and honest declarations by all research centres of the work which is being carried out, and an exchange of visits. On-site challenge inspection would provide an additional means of verification and confidence-building.

The development and production of biological and toxin weapons agents by a country with insufficient technical competence conducting such work without maximum containment facilities poses a very serious threat, one that cannot be over-estimated. As stated before, this could lead to the spread of epidemics, not only in one country and its environs, but throughout the whole world. This constitutes a real threat to every country in the world and should be given serious consideration at the forthcoming Review Conference. Perhaps the best way to avoid such a threat would be to achieve universal adherence to the Convention. The ways and means of achieving universal adherence to the Convention should be the main objective of the Review Conference.

Notes

1 *Fiscal Year 1979: Arms Control Impact Statements: Statements submitted to the Congress by the President Pursuant to Section 36 of the Arms Control and Disarmament Act* (Washington, DC, US Government Printing Office, 1978), p. 220.

2 United Nations, "New scientific and technological developments relevant to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction": background paper submitted by the Depository Governments and provided to all States Parties to the Convention before the Review Conference (BWC/CONF.I/5, of 8 February 1980), p. 11.

3 Matthew Meselson, Martin Kaplan and Mark A. Mokulsky, "Verification of Biological and Toxin Weapons Disarmament Verification-monitoring", *Disarmament* (Westview Press, 1990).

4 United States Department of State, Summary of the Genetic Engineering Expert Panel, submitted to the Assistant Secretary of State, James Melone, 26 May 1981, p. 4.

5 Martin Kaplan, Excerpt from statement at the Pugwash Symposium on Scientific and Technical Aspects of Development of New Weapons, Verification Issues and Global Security, *Disarmament*, vol. XI, No. 3, 1988, pp. 72 ff.

Strengthening the Biological Weapons Convention

Erhard Geissler

Introduction

In 1972, when the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, known as the biological weapons Convention, was concluded, biological and toxin warfare agents seemed to have rather little military value.

After the emergence of the new molecular biotechnology, including genetic engineering, the three depositary Governments—the Soviet Union, the United Kingdom and the United States—in their background paper prepared for the States parties to the biological weapons Convention before the First Review Conference, in 1980, emphasized that

> "modifying an organism by recombinant DNA techniques is similar in effect to modifying it by classical genetic techniques".[1]

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The majority of the participants in the First Review Conference shared this view and noted

> "that Article I [of the biological weapons Convention] has proved sufficiently comprehensive to have covered recent scientific and technological developments relevant to the Convention".[2]

The New Threat of Biological and Toxin Weapons

However, this view has changed in recent years.[3] The broader introduction of molecular biotechnology caused a re-evaluation of the military value of biological and toxin weapons in the early 1980s. The new assessment was described most clearly in 1986 by the United States Department of Defense as follows:

> "Perhaps the most significant event in the history of biological weapons development has been the advent of biotechnology. . . . It enables the development of new microorganisms and products with new, unorthodox characteristics. . . . Conceptually, then, a nation or terrorist group can design a biological weapon to meet a variety of contingencies or needs. . . . The breakthrough and the subsequent achievements make biological warfare much more feasible and effective . . .".[4]

Numerous scientists, politicians, military leaders and diplomats, including participants in the Second Review Conference of the States parties to the biological weapons Convention, shared this view, at least in principle.

Although some scientists have expressed different opinions, I too believe that the emergence of the new techniques has increased the threat of biological and toxin warfare.[5] Molecular biotechnological methods make it possible, for example, not only to produce militarily significant amounts of super-toxic toxins but to insert toxin genes into the genetic material of several viruses. Thus "second generation biological weapon agents"[5] might be created. Second-generation biological weapon agents are combinations of biological and toxin weapons, that is, genes coding for super-toxic toxins integrated into the genomes of highly contagious or otherwise militarily "interesting" viruses. On the other hand, molecular biotechnology now provides several means for developing highly efficient vaccines. Such vaccines might be used, *inter alia*, to protect the troops of an attacker against a biological or toxin weapon agent which the attacker himself intended to use. Thus, vaccines might provide a biological first-strike capacity.

Although the development and production of new biological and toxin weapon agents and their use are forbidden by the biological weapons Convention and by the Geneva Protocol, the new situation created by the recent developments in molecular biotechnology might reduce the willingness of some States parties to adhere to their commitments. One should remember in this connection that Iraq, which is a State party to the Geneva Protocol, used chemical weapons during its war with Iran and obviously also against its own Kurdish population without any serious reactions on the part of the international community. As this violation of the Geneva Protocol was, apparently, not without military success, and as a further use of chemical weapons in this highly sensitive region cannot be excluded at this very time, other States, whether signatories or even States parties to the biological weapons Convention or certain militant groups, might also consider making use of these types of "poor man's atomic bombs".

It should be pointed out in this connection that there are still some 60 countries that have not yet ratified the Convention. The overwhelming majority of these are developing countries. Iraq, for example, has signed but not ratified the Convention, and Israel is not even a signatory.

It should be emphasized also that several States parties to the Geneva Protocol, including the five permanent members of the United Nations Security Council, have reserved their right to use chemical and biological weapons in the event that any adversary should use them first.[6] With respect to bacteriological and toxin weapons this reservation is unequivocally in contradiction to the provisions of the biological weapons Convention. Nevertheless, only Australia, Barbados and Ireland have so far declared that they have decided to withdraw this reservation. Similar declarations by other States would undoubtedly contribute to strengthening the biological weapons Convention.

Whatever the real military value of biological and toxin weapon agents or the military threat of molecular biotechnology, fears of such matters have been used as a justification for expanding "biological defence research programmes" in at least two countries, the United States and the Soviet Union. However, the risks involved in such programmes should be well understood. One risk arises from the simple fact that the mere existence of such programmes might trigger an action-reaction cycle of comparable activities by other nations, thus leading to a "biological defence research race". Another risk is that increasing biological and toxin warfare defence activities involving dangerous pathogens might result in an unintentional release of pathogenic agents, be they genetically engineered or not.

An increasing probability of unintentional release of dangerous agents is in part associated with the proliferation of biological and toxin warfare technology. Proliferation is a danger in this respect because the operations involved in the development of these agents might be carried out in some countries with insufficient technical competence and responsibility. This might lead, even without any military applications, to a breakdown of containment resulting in outbreaks of infectious diseases and intoxinations among human beings, crops and livestock.

Domestic Legislation

It should be stressed that the Convention binds only Governments of States parties and not their respective populations. Article IV of the Convention therefore imposes an obligation upon parties to enact domestic legislation criminalizing the development, production, stockpiling and acquisition or retention of biological and toxin weapons. Only a minority of States have so far taken action to incorporate the commitments of the Convention into national law: Australia, Belgium, Bulgaria, Finland, France, the Netherlands, New Zealand, Norway, the United Kingdom and the United States.[7]

Domestic legislation is also necessary to prevent unauthorized or criminal access to such agents. It would also contribute to the prevention of proliferation. Domestic legislation should also prevent the acquisition, stockpiling and use of biological and toxin weapons by the secret services.

The Danger of Proliferation

Now that the cold war has come to a peaceful end, the prospect of East-West biological warfare has eased dramatically. There is increasing concern, however, that a biological and toxin arms race might be a North-South or South-South problem. United States sources have claimed, for example, that the number of States having offensive biological weapon programmes has risen from 4 to 10 since 1972[8] and that "3 countries world-wide now have bacteriological weapons", while 15 others are "suspected" of developing them.[9] Regardless of the accuracy of these reports, which cannot be verified by an independent observer inasmuch as the list of the States accused is classified, measures should be taken to prevent proliferation both of those types and quantities of biological agents and toxins that are available for permitted purposes and of the corresponding technology.

The danger of proliferation of biological and toxin weapons should also be discussed in connection with the implementation of article X of the Convention. Under this article States parties undertake to facilitate, and to participate in, "the fullest possible exchange of equipment, materials and scientific and technological information for the use of bacteriological (biological) agents and toxins for peaceful purposes". This obligation cannot be fulfilled without dealing with problems posed by the possibility of proliferation. It is also inevitable that confidence-building and verification of compliance cannot be discussed separately from the problems of peaceful co-operation. Why should we not, therefore, following the example set in the successful international co-operation in the eradication of smallpox, encourage States to consider joining forces, preferably under the auspices of the World Health Organization, to ensure that the fruits of biotechnology are grown and harvested for health care and other peaceful purposes only and that they are made universally available?[10]

Loopholes in the Biological Weapons Convention and the Geneva Protocol

The new possibilities provided by molecular biotechnology reveal that there are some loopholes in both the biological weapons Convention and the Geneva Protocol. For example, neither treaty provides for verification measures. The Convention does not restrict research on potential biological and toxin weapon agents, and it permits the development, production and stockpiling of biological and toxin weapon agents for prophylactic, protective and other ostensibly "peaceful" purposes without any limitation. As already mentioned, vaccines can be used not only for defence but also to protect troops in advance of a prospective attack in which biological and toxin agents might be used. If, however, the development of vaccines against potential biological and toxin agents as well as other permitted activities directly related to the Convention were to become internationalized, there would be less room for suspicion of a possible offensive intention behind activities ostensibly carried out for peaceful purposes.

First Attempts to Strengthen the BW Convention

The biological weapons Convention must be strengthened in order to spare humankind a biological and toxin arms race. The participants in the Second Review Conference took a positive first step in that direction in agreeing upon a number of confidence-building measures. Implementation of those measures is not enough, however.[11] The efficacy of the information exchange is disappointing, with respect both to the level of participation and to the completeness of the information provided. To date, only 36 States have exchanged information (see list at end of article).

As increasing concern is raised regarding the danger of the proliferation of biological and toxin weapon technologies, the almost total lack of participation by third world countries is disturbing. Only one contribution was made by an African State. Only three reports have been provided by Asian developing countries. Only three Latin American States have so far participated in the information exchange.

The efficacy of the information exchange is also disappointing, because even participating States did not provide complete information as requested by the 1987 *Ad Hoc* Meeting of Experts. For example, the majority of the more than 100 institutions[12] involved in the United States Biological Defense Research Program and of the approximately 70 facilities involved in a similar programme carried out in the USSR[13] are not mentioned in the reports submitted by these States. These and other results demonstrate that the agreement to report on research centres and laboratories is both ambiguous and insufficient. For example, if only those facilities which are specialized in R&D directly related to the biological weapons Convention are to be included, then other centres and laboratories which are specialized in other fields of biosciences but which are nevertheless involved in activities related to the Convention, be it only in one laboratory, are exempted from inclusion in the reports.

States parties have been requested also to exchange information on outbreaks of infectious diseases and intoxinations that seem to deviate from the normal pattern. Only one outbreak was reported in 1990, namely, by the United Kingdom. No other outbreak has been described although approximately 70 outbreaks occurred, during the period covered, in States participating in the information exchange and should, according to the modalities, have been reported. In Canada, for example, an "amnesic shellfish poisoning" occurred in 1987[14] which bore "many similarities to the situation that might be expected from a clandestine attack using such a novel agent".[15] The outbreak should have been reported immediately to the States parties to the Convention, as well as in the 1988 Canadian report.

The next steps necessary to strengthen the biological weapons Convention should include an agreement on legally binding measures. The measures agreed at the Second Review Conference have proved to be inadequate because they are not legally binding. Proposals made during the Conference for negotiation of an additional protocol were rejected, in part with the argument that the participants lacked a mandate to negotiate an additional protocol. It was also argued that it would be appropriate to await the conclusion of a chemical weapons convention, given the generally optimistic view that that convention would be completed soon. This optimism has proved to be misplaced. It is questionable whether a chemical weapons convention will be completed or enter into force in the near future. There is no longer any justification for postponing the preparation of legally binding measures to strengthen the biological weapons Convention. The Third Review Conference should therefore be given a mandate to convoke a series of meetings of experts from the parties to draw up a draft proposal for an additional protocol.

Proposed Additional Measures to Strengthen the BW Convention

Proposals to strengthen the Convention have already been put forward.[16] A comprehensive set of recommendations was provided by an expert group convened by the Federation of American Scientists.[17] Proposals put forward to strengthen the biological weapons Convention include, *inter alia*, the following recommendations:

1 It might be appropriate for the Preparatory Committee of the Third Review Conference to request the United Nations Department for Disarmament Affairs to prepare and circulate in advance of the Conference a paper[18] describing, *inter alia*, (*a*) the results of the confidence-building measures; (*b*) domestic compliance measures including national implementation systems.

2 The Third Review Conference should define unambiguously which activities, agents etc. are covered by the phrase "directly related to the Convention", and which activities are permitted.[19]

3 The Conference should reaffirm that microbial and other biological agents and toxins deleterious to plants, animals and humans are included under the agents covered by the Convention.[18]

4 The Conference should reaffirm that biologically produced chemicals are included under "other biological agents, or toxins" covered by article I of the Convention and should define which organisms are covered by the term "other biological agents".[17]

5 The Conference should emphasize that the creation of biological agents or toxins with altered properties that might increase their usefulness as weapon agents is not justified for any military purpose, including protection against possible hostile use.[17]

6 The Conference should establish (an) expert group(s) to consider: (*a*) whether measures can be established to prevent biomedical research from being misused in support of offensive purposes;[18] (*b*) whether an epidemiological surveillance programme[20] can be established; (*c*) whether an international verification laboratory[19] can be established; (*d*) whether an international programme for the development and usage of vaccines[5] can be established.

7 The Conference should recommend that States parties adopt national legislation that would require adherence in the levels of containment for infectious agents set by WHO and would require that recombinant and other novel infectious agents be subjected to the highest level of containment appropriate.[17]

8 The Conference should emphasize that all activities in the field of biological defence R&D be conducted in complete openness, preferably in civilian facilities and with public health rather than military funding.[18]

9 Each State party should be required to make routine annual declarations[17] of (*a*) all facilities, governmental and private, that conduct research, development, testing, production or other permitted activities directly related to the Convention; (*b*) all biosafety level 4, biosafety level 3, and other special facilities possessing containment equipment and/or structural features designed to protect the environment and personnel outside the containment unit; (*c*) all facilities for the deliberate production of aerosols under biosafety level 2 or higher containment; (*d*) all transfers of controlled agents into and out of the boundaries of the

facilities declared; (*e*) all outbreaks of disease caused, or possibly caused, by agents subject to declaration; (*f*) all military and all mass civilian immunization programmes and all military programmes for the development and use of vaccines; (*g*) all sites for open-air field-testing or training for protection against biological and toxin warfare; (*h*) the time and site of any open-air military operation that includes field testing or training in protection against biological and toxin warfare; (*i*) actions it has taken to assure domestic compliance with the Convention; (*j*) all publications based on work done at declared facilities; even if only to state that it has nothing to declare.

10 The Conference should seek the assistance of WHO in reporting and evaluating information provided on such matters as facilities, agents and outbreaks.[21]

11 The Conference should agree that States parties will give advance notice of the time and site of any open-air military training operation in biological and toxin weapon defence.[17]

12 The Conference should consider the question whether all information to be reported on should be fed into a central data base affiliated with a verification agency, the United Nations Department for Disarmament Affairs, or WHO.[5]

13 The Conference should consider establishing a continuing body[17,18] (*a*) to oversee and facilitate the functioning of the Convention during the intervals between review conferences; (*b*) to process and evaluate the outcome of the information exchange; (*c*) to report any questions raised by States parties about information supplied by other States and make suggestions with regard to the further monitoring or scrutiny of the reports of States parties; (*d*) to ask countries which did not report why they failed to do so.

14 The Conference should agree to establish an inspectorate to administer the verification protocol and procedures for inspections of declared facilities, for challenge inspections, and for special monitoring.[17,18]

15 The Conference should declare that any State party has the right to request the Secretary-General of the United Nations to conduct a timely fact-finding inquiry into compliance concerns and should stress the obligation of States parties to cooperate with such an inquiry. The Third Review Conference should request the General Assembly to adopt a resolution enabling the Secretary-General to respond to such requests.[17]

16 The Conference should consider expanding article IV of the biological weapons Convention[18] to emphasize that: (*a*) it shall be unlawful for any person living in any State party knowingly to engage in any activity prohibited by the Convention; (*b*) any person living in a State party who knows of any activity in violation of the Convention shall have the affirmative duty to report such activity to suitable national and international supervisory organizations; (*c*) any person living in a State party who shall have made a good faith report under the preceding mandate shall be protected from adverse economic or other sanctions by his or her State, by the community of scientists, and by the community of nations.[20]

Conclusion

The biological weapons Convention should and can be strengthened in order to prevent biological and toxin warfare and to restrict the use of biotechnology to peaceful purposes. The confidence-building measures agreed upon by the Second Review Conference represent a first, though incomplete, step in this direction. Additional legally binding actions need to be taken as discussed in this paper.

States which participated in the information exchange

Australia	(1987, 1990)
Austria	(1990)
Belgium	(1988)
Bulgaria	(1988-1989)
Byelorussian SSR	(1987-1990)
Canada	(1987-1990)
Chile	(1990)
China	(1989-1990)
Czechoslovakia	(1987-1990)
Denmark	(1987-1990)
Democratic People's Republic of Korea	(1990)
Ecuador	(1990)
Finland	(1987-1990)
France	(1989)
German Democratic Republic	(1988-1990)
Germany, Federal Republic of	(1987-1990)
Greece	(1990)
Hungary	(1987)
Ireland	(1988, 1990)
Italy	(1989-1990)
Japan	(1988)
Mexico	(1990)
Mongolia	(1990)
Netherlands	(1987-1990)
New Zealand	(1987-1990)
Norway	(1987-1990)
Poland	(1987-1988)
Portugal	(1990)
Spain	(1987-1990)
Sweden	(1987-1990)
Switzerland	(1988-1990)
Togo	(1988)
Ukrainian SSR	(1987-1990)
United Kingdom	(1987-1990)
United States	(1987-1990)
Union of Soviet Socialist Republics	(1987-1990)

Notes

1 BWC/CONF.I/4 (Geneva, 20 February 1980), p. 7.

2 BWC/CONF.I/10 (Geneva, 21 March 1980), p. 7.

3 See E. Geissler, ed., *Biological and Toxin Weapons Today* (Oxford, 1986); C. Pillar and K. R. Yamamoto, *Gene Wars: Military Control over the New Genetic Technologies* (New York, 1988).

4 United States Department of Defense, "Biological Defense Program": Report to the Committee on Appropriations, United States House of Representatives (Washington, D.C., 1986), pp. I-7, IX-1.

5 E. Geissler, "Biological and toxin weapons and the responsibility of scientists—twenty years later", *in* E. Geissler and R. H. Haynes (eds.), *Prevention of a Biological and Toxin Arms Race and the Responsibility of Scientists* (Berlin, 1991), pp. 3-29.

6 E. Geissler, ed., "Strengthening the biological weapons convention by confidence-building measures", SIPRI Chemical & Biological Warfare Studies No. 10 (Oxford, Oxford University Press, 1990), pp. 51-52, table 5.2.

7 D. Scott, "The concept of treaty-mandated compliance legislation under the biological weapons convention", *in* Geissler and Haynes (note 5), pp. 345-367, p. 356. Although the First Review Conference called upon States parties to deposit copies of their legislation with the United Nations Department for Disarmament Affairs, both Dr. Scott (see p. 366) and the author of this article have been informed by the Department that no such copies had been deposited.

8 Testimony of T. J. Welsh, Deputy Assistant to the Secretary of Defense, *in* Biological Warfare Testing, Hearing, House of Representatives, 3 May 1988 (Washington, D.C.), p. 42.

9 Statement by Admiral C. A. H. Trost, Chief of Naval Operations, before the House Armed Services Committee, United States Congress, 20 February 1990. Quoted in *Chemical Weapons Convention Bulletin*, No. 8 (June 1990), p. 9.

10 Geissler (note 5), p. 16.

11 Geissler (note 6) and "The first four rounds of information exchange", *in* Geissler and Haynes (note 5), pp. 267-276.

12 United States Department of the Army, "Institutions performing BDRP", *Biological Defense Research Program: Final Programmatic Environmental Impact Statement* (April) (United States Army Medical Research and Development Command, Frederick, Maryland, 1989), pp. A3-1–A3-9.

13 Unpublished information.

14 C. J. Bird and others, "Identification of domoic acid as the toxic agent responsible for the P.E.I. contaminated mussel incident", a summary of work conducted at the Atlantic Research Laboratory of the National Research Council, Halifax, between 13

December 1987 and 11 January 1988 (Atlantic Research Laboratory Technical Report, No. 56, NRCC No. 28083). See also B. H. Schiefer, "The verification of allegations of use of novel chemical or toxin weapons: some practical considerations" (1991), *in* Geissler and Haynes (note 5), pp. 329-338.

15 Conference on Disarmament working paper CD/CW/WP.254. Quoted in *Chemical Weapons Convention Bulletin*, No. 6 (November 1989), p. 8.

16 S. Wright, ed., *Preventing a Biological Arms Race* (Cambridge, Mass.); Geissler (note 6); N. A. Sims, "Exogenous development of the multilateral treaty regime (MTR) flowing from the BWC: proposals for special conferences and for a continuous central capability", *in* Geissler and Haynes (note 5), pp. 441-469; S. J. Lundin, ed., *Views on Possible Verification Measures of the Biological Weapons Convention* (Oxford) (forthcoming).

17 Proposals for the Third Review Conference of the Biological Weapons Convention. Report of the Federation of American Scientists Working Group on Biological and Toxin Weapons Verification (revised), October 1990. Reprinted in Geissler and Haynes (note 5), pp. 485-505.

18 E. Geissler and M. Rice, "Comments regarding the report of the FAS working group", *in* Geissler and Haynes (note 5), pp. 507-510.

19 See H. B. Schiefer, "Verification and diagnostic problems in the event of unusual chemical/biological weapons use", International Conference on Combating the Use of Chemical and Biological Weapons (Geneva, International Commission of Health Professionals, 1989), pp. 73-81. See also note 14.

20 M. Wheelis, "The role of epidemiology in strengthening the biological weapons convention", *in* Geissler and Haynes (note 5), pp. 277-283.

21 See Geissler (note 6), pp. 48-49, 138, 152-153.

Towards the Third Biological Weapons Convention Review Conference

The Next Step: A Biological Verification Régime

Barbara Hatch Rosenberg

The Third Review Conference of the Treaty on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction has been entrusted with a serious responsibility, one that will determine the course and the success of biological disarmament for a long time to come. The Review Conference is awaited with great expectations for real progress.

The Need

Yasushi Akashi, United Nations Under-Secretary-General for Disarmament Affairs, commented recently on the present state of the Convention:

> "In spite of its intrinsic value, the biological weapons Convention has been criticized for its lack of appropriate measures for verification of compliance. Over the past ten years, some concerns have been expressed in the international community regarding certain ambiguities and unresolved matters . . . including questions of verification and compliance,

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confidence-building measures, and legal and ethical issues."[1]

These concerns spring from the explosive growth of biotechnology since the time when the Convention was signed, which has made biological and toxin weapons agents far more accessible than they ever were before and provided means for altering their characteristics, through genetic engineering, in ways that might be militarily useful. The inevitable and widespread military interest in the technology has generated suspicions, intensified because biological weapons are relatively cheap and technologically accessible as weapons of mass destruction and because the use of chemical weapons in the course of the last decade without significant international response has weakened the moral barriers to the use of biological weapons.

The Convention itself, as it now stands, does not help to resolve these concerns. By permitting the possession of biological agents of types and in quantities that are justified for "prophylactic, protective or other peaceful purposes", it permits the possession of seed stocks that can now be rapidly amplified and it permits programmes in biological defence that also have offensive import. Threat assessment, for example, carried out for defensive purposes, unavoidably provides information on the optimal procedures for the offensive use of the agents assessed; it might even be construed by some as including the creation of novel agents, in order to test defences against them. Even vaccine development has an offensive component, for the use of a biological weapon requires a good defence to protect the user. The strong overlap between defensive and offensive activities makes intention a determinant of compliance with the Convention, and this is an invitation to controversy and loss of confidence—especially since the Convention does not provide adequate procedures for resolving compliance concerns and complaints.

On the other hand, biotechnology has made the biological weapons Convention more necessary than ever. Given the vast variety and unpredictability of the biological agents that exist or could be engineered, and the intrinsically unpredictable nature of their behaviour as weapons, it is not possible to develop a sure defence. An effective treaty is the best defence; and so the Convention must be amended.

At the Second Review Conference, in 1986, "most delegations agreed that the verification of compliance and complaints procedures required improvement. It was generally recognized that . . . [this] would promote confidence among States Parties".[2] The President of the Review Conference, Austrian Ambassador Winfried Lang, wrote afterwards:

> "In the light of repeated statements to the effect that the treaty régime was in trouble and that its vulnerability could not be overlooked any longer, the Conference was challenged . . . to strengthen an ailing treaty régime without the possibility of major surgery."[3]

The Second Review Conference did its best, agreeing on an unprecedented extension of the interpretation of article V of the Convention, on co-operation in solving problems, to include an annual exchange of information on high-containment facilities and those that specialize in biological defence, and on unusual outbreaks of disease. But, although some five formal proposals were put forward to consider the negotiation of a supplemental protocol on verification, the idea was set aside pending the completion—thought to be imminent—of the chemical weapons convention, whose stringent verification provisions would serve as a model. The "major surgery" was left to the Third Review Conference.

The results of the voluntary information exchange instituted at the last Review Conference have been disappointing in that the majority of the States parties have not participated, in spite of reminders sent by the Department for Disarmament Affairs of the United Nations Secretariat, even to say they had nothing to report; and the information that has been provided by participants has not always been complete.[4] The information exchanged is very limited; proposals for additional, highly relevant exchanges were turned down at the Review Conference. It seems unlikely that a great deal more can be expected of voluntary measures.

Confidence-building, however, is urgent, particularly in the Middle East, where only a minority of States have ratified the biological weapons Convention and none have participated in the exchange. The present crisis there holds out hope for an eventual settlement that would eliminate weapons of mass destruction from the region—but, for biological weapons, that would not be likely without a legally binding régime for demonstrating compliance and detecting violations of the Convention.

The Final Declaration of the Second Review Conference reads:

> "The Conference, noting the differing views with regard to verification, decides that the Third Review Conference shall consider, *inter alia*: . . . the effectiveness of the provisions in Article V for consultation and co-operation and of the co-operative measures agreed in this Final Declaration, and . . . whether or not further actions are called for to create further co-operative measures in the context of Article V, or legally binding improvements to the Convention, or a combination of both."[5]

The Third Review Conference is the time for action, regardless of the state of the chemical weapons negotiations. Without the openness that only a legally binding verification régime could impose, suspicions will continue to erode the biological weapons Convention. The onward march of biological science and technology will continue to make their military exploitation ever more dangerous and more tempting. Military investment in biotechnology is growing and will become increasingly difficult to reverse; the possibility of accidental escape of biological weapons agents will increasingly threaten public health. The threat of biological weapons proliferation is growing as tensions reorient from East/West to North/South; international concern was evident at the 1989 Paris Conference on the Geneva Protocol and is evident in the current Gulf crisis. The Third Review Conference should build on this concern and set in motion the process of drawing up verification procedures. This in itself would constitute a powerful confidence-building measure.

Proposals for Action

To take advantage of the historic opportunity offered by the Third Review Conference, the Federation of American Scientists* convened a Working Group on Biological and Toxin Weapons Verification composed of experts from the fields of biological science, industry and diplomacy, chaired by Dr. Robert Weinberg, Member of the Whitehead Institute and Professor of Biology at the Massachusetts Institute of Technology. The Group developed a series of proposals, which were reviewed, with written commentaries, by more than 130 scientists, policymakers, industry representatives and academics with appropriate expertise from around the world before they were made final and issued in October 1990 as a report entitled "Proposals for the Third Review Conference of the Biological Weapons Convention". Part of the report is included in the annex to this article. The report includes both short-term proposals for immediate action at the Review Conference and long-term proposals for incorporation into a verification protocol, with a rationale for each proposal.

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*The Federation of American Scientists, founded in 1945 by members of the Manhattan Project as the Federation of Atomic Scientists, is the first major organization after the Second World War dedicated to ending the arms race.

Among the short-term proposals are three affirmations of the intent of the biological weapons Convention (under article I), upon which specific verification measures can be based. If the Review Conference were to agree explicitly to these interpretations they would carry weight, even without a legal document, as a part of "subsequent practice" as defined by the United Nations Convention on the Law of Treaties adopted at Vienna. Affirmation A, which states that the creation of novel agents for any military purpose is not justified under the biological weapons Convention, is important because it deals with a major fear that drives suspicions. Affirmation B, which states that all biologically produced chemicals not justified for peaceful purposes are covered by the biological weapons Convention (as well as by the chemical weapons convention currently under negotiation), makes it clear that emerging threats such as endogenous bioregulators are covered, as well as classical toxins. These are statements of coverage, not definitions; the Convention language must not be limited by precise definitions if it is to remain relevant to new and unforeseen scientific developments and applications.

Several other proposals would extend the present voluntary annual information exchange. Most notably, proposal D under article V would specify declaration of all facilities engaged in biological defence activities, without the present limitations. In general, these are the facilities of greatest concern, and an exchange of information on all of them would provide considerable reassurance.

The Review Conference could also agree on a prohibition of transfers and co-operative activities relevant to biological defence involving non-parties to the biological weapons Convention (proposal A under article III). Article III already prohibits such activities with respect to weapons. Because of the significant overlap between defensive and offensive activities, this extension is important as a non-proliferation measure. It also provides an additional incentive to ratify the biological weapons Convention.

Two proposals (B and E) under article V are particularly important as interim measures before the adoption of a legally binding verification régime. The Secretary-General of the United Nations could be requested to investigate compliance concerns relating to the biological weapons Convention, as he has been empowered to do for the Geneva Convention; and a committee could be established to oversee the annual information exchange and the proper functioning of the treaty régime between review conferences. In this regard, small contributions from States parties would enable the Department for Disarmament Affairs of the United Nations Secretariat to act as a temporary secretariat; among other things, the information exchanged could be made more accessible by translation and incorporation into the Department's verification data bank, now under development.

The major recommendation in the report is that the Review Conference should call an *ad hoc* meeting of experts from the States parties to draft proposals for a verification protocol to the biological weapons Convention. The resulting proposals could be used subsequently as a basis for negotiation, perhaps after completion of the chemical weapons convention. While much could be borrowed from the chemical weapons convention once it has been signed, verification with regard to biological weapons also has many unique requirements, including declarations, prohibitions and lists of controlled agents. By taking up these specific issues in a less formal way now the parties would convey the seriousness of their concerns and intentions and would make it possible to adopt a verification protocol with little delay after the completion of the chemical weapons convention.

A Verification Protocol

The long-term proposals in the report of the Federation of American Scientists are put forward not only as suggestions for the drafters of a protocol but, most important, as evidence that it is possible to design a workable and effective verification régime. Additional evidence is contained in a second report, issued by the Federation in January 1991, entitled "Implementation of the Proposals for a Verification Protocol to the Biological Weapons Convention".

The proposals for a verification protocol are presented in the annex and will be discussed here. They are based on the following principles:

1 The régime should borrow as extensively as possible from the draft chemical weapons convention, which is already under negotiation and has many similarities.

2 Because of the very substantial civilian-military overlap in biological activities, the régime should rely on openness rather than prohibitions. Both civilian and military facilities must be included, in order to avoid circumvention of verification measures by the use of civilian facilities as covers for military activities. This will necessitate some intrusion into civilian matters. There must be arrangements to safeguard confidentiality, where needed.

3 Everything objectively verifiable that could give rise to suspicions or might be useful for prohibited purposes should be declared and thereby opened to the possibility of routine inspection. Because stockpiles of weapons agents could be produced relatively quickly, production potential as well as actual production of agents must be open for verification. Most of the declared facilities will be

civilian and unquestionably peaceful; but in order to make sure that any illegitimate activities that may occur anywhere (regardless of the level of prudence or technological sophistication) are covered, all parties must declare certain normal civilian operations. These will include the kinds of basic facilities that a weak nation under pressure might be tempted to utilize for biological weapons purposes.

4 Annual declaration requirements should be clearly defined, avoiding matters of judgement or matters of intent or purpose, which are too subjective to be reliable. Incisive and comprehensive declaration requirements would serve best to deter activities not justified for peaceful purposes and would tend to force violations to go clandestine. Violations of the biological weapons Convention would then be equivalent to lack of compliance with declaration requirements, which could be objectively established without reference to motives, purposes or even specific biological agents.

5 Declarations and inspections of declared sites should be routine, with no implication of non-compliance.

6 The declaration requirements should be such that complete and accurate compliance with them would provide the transparency in relevant activities that is needed to inspire confidence in compliance with the biological weapons Convention. Verification would consist of demonstrating the accuracy of the declarations. This would be the aim of inspections of all types.

7 The régime should be acceptable to all affected, including science, industry and the military.

The proposals represent a rough sketch for a biological verification régime, with many details missing. They would not provide perfect verification; that would not be realistic. Their purpose is to institutionalize openness and provide a means of demonstrating compliance, allaying suspicions and deterring violations. Means are also proposed for uncovering violations, but this is not the main concern, for almost nothing is generically prohibited. The primary objective is to make all relevant information openly available. Thus, a legally binding protocol is essential, for it will be necessary to divulge what is now usually withheld for reasons of national security. It is unlikely that this would be considered acceptable without the assurance that others will do the same.

A verification régime must elicit a maximum of information with a minimum of political difficulty. The proposed scheme utilizes mandatory annual declarations and inspections for this purpose. One of the requirements, the declaration of all facilities containing controlled agents, necessitates an agreed list of such agents. In an appendix to the annex (not included here), the report proposes a set of controlled categories, summarized as follows:

—All agents already developed as weapons

—All agents of World Health Organization (WHO) risk groups III and IV

—All risk group II agents that are possible biological weapons candidates

—All pathogens quarantined by any Party

—All serious animal and plant pathogens

—All pathogens not fully described in the literature (including recombinants involving a pathogen)

—All derivatives of the foregoing agents that have decreased pathogenicity (and could therefore be used as simulants for offensive studies under low containment)

—All classical toxins and other chemicals of biological origin with an LD_{50} of less than 10 mg/kg.

Because of the widespread use of toxins in civilian research, the possession of specified small quantities is exempted from declaration. All of the agents to be controlled are pathogenic, whereas most organisms and chemicals handled in civilian research and technology are not. The verification proposals include a requirement for appropriate containment of infectious agents and a prohibition on open-air release of controlled agents.

Other annual declarations take aim, among other things, at certain "choke points" in the production and weaponization of biological agents. The declaration of all facilities engaged in biological defence activities, discussed under short-term proposals, would become obligatory. (Other relevant short-term measures would also be included in the protocol.) Collateral information to be supplied with each declaration is specified in the January 1991 Implementation Report and is meant to indicate the capabilities and actual activities of the declared facility/site so as to be both effective in providing reassurance about the declared site and adequate as a basis for the interpretation of any subsequent inspection results.

The Working Group also recommends that personnel exchange, particularly between declared government facilities, should be encouraged on a bilateral basis among States parties under a verification protocol, and the possibility of a multilateral exchange programme should be considered. This would provide an important means of reassurance and a valuable supplement to the verification régime.

Verification would also be enhanced by an international programme for surveillance of infectious diseases, intoxinations and the emergence of new epidemic/epizootic threats. Such a programme is much needed as a global health measure.[6,7] In connection with biological verification, unusual outbreaks of disease could be more accurately interpreted and the detection of illicit testing, accidental escape or hostile use of controlled agents would be greatly facilitated.[8] Participation in such a programme, which should include the training of local experts and should be directed towards the internationalization of vaccine production, could be limited to States parties to the biological weapons Convention and its verification protocol. In the absence of an established programme, the treaty organization under the protocol could collect and collate the data available from States parties, WHO and other sources and could encourage and assist the States parties in developing an appropriate infrastructure for surveillance.

The proposed inspection measures (see annex) include challenge inspection, with provisions similar to those in the draft chemical weapons convention, and inspection of declared facilities, utilizing a targeted system in which each State party selects a fixed number of inspection sites per year, with additional sites chosen by the inspectorate. There would be no suggestion of treaty violation in the selection process.

The Federation's "Report on Implementation" lists the documentation that should be maintained at declared sites for access during inspection and broadly outlines proposed inspection procedures, based in so far as possible on those of the draft chemical weapons convention. The report covers sources of information relevant to compliance with the biological weapons Convention, and discusses the kinds of information accessible through on-site inspection and its effectiveness for verification.

Although there are characteristic difficulties in verification of biological weapons, there are also unique and extremely valuable facilitating factors in comparison with verification of other types of weapons: namely, the need for stringent safety precautions, and the inevitable presence of specific antibodies in the blood of humans and animals either exposed to biological agents or immunized against them. The physical safety measures needed for many biological weapons agents exceed and differ from those required even for chemical weapons, and it would be essentially impossible to hide them from inspectors. Antibodies can readily be detected in blood samples from any exposed mammal, from laboratory mice to troops. Thus, antibodies are always there to bear witness to biological agents, even when agent stocks have been removed, hidden or destroyed before inspection. Traces of the agents may also be found in, for example, wastes and air filters.

A practised inspector would be able to extrapolate from a relatively few observations and could confirm his conclusions with a few more spot checks. The relevant facts assembled by the inspector would then make possible an estimate of the nature and scale of potential or current operations at the inspected site, to be weighed against the capabilities and activities declared. The degree of openness evidenced, together with the appropriateness for peaceful purposes of the activities and facilities in their social and economic context, would enable other States parties to evaluate the degree of confidence they should place in compliance with the biological weapons Convention at the inspected site. The availability of reliable facts would reduce misunderstanding, and the effectiveness of inspection would provide an additional incentive for States parties to ensure that their own declarations were accurate.

Under the proposed verification régime, the following conclusions could be drawn from on-site inspection:

—No evidence of non-compliance;

—Failure to comply or incomplete compliance with one or more declaration requirements; or

—Inconsistency or ambiguity of declared information with respect to the observed facts regarding the capabilities of the site, the activities conducted there, or the agents handled.

Clearly, the more extensive and incisive the declaration requirements, the more meaningful these conclusions would be. Specification of the nature of the incompleteness, inconsistency or ambiguity in the inspection report would focus attention on the character of possible violations of the biological weapons Convention that might be present at the inspected site.

With the proposed verification régime, the major hurdle (which must be left to the national intelligence of the States parties) would be the discovery of clandestine sites and activities so that they can be inspected or monitored. Once opened for routine or challenge inspection, however, illicit activities on any significant scale could not be covered up with any likelihood of success. They would be exposed as, at the least, questionable. This is not the same thing as proof of violation of the biological weapons Convention, however; it would still be up to the States parties to judge whether or not the situation could be justified for peaceful purposes. This uncertainty is intrinsic in biological verification, but it does not preclude operational conclusions regarding the trustworthiness and responsibility of States parties.

By opening their facilities to international inspection, States parties would enhance their credibility and encourage other States to participate in the Treaty régime. Confidence and mutual trust would gradually increase as the information provided in annual declarations was consistently confirmed by on-site inspection. In cases of ambiguity or clear violation, the régime would prevent surprise and allow political action or protective measures to be taken. It would build confidence that the parties would act collectively to oppose any violation.

Cost

A verification protocol will of course cost money, but considerably less than for the chemical weapons convention; and less still if some organizational arrangements can be shared with the chemical weapons convention. There is no destruction of stockpiles or production facilities to be monitored, and, with the targeted inspection system proposed for declared facilities, a relatively small number of inspections per year would still exert a strong deterrent effect. Many declared facilities would be inspected very infrequently, perhaps never. Although not predictable, inspections would generally be concentrated on the sites of most concern. The régime would provide confidence with relatively little intrusion and at reasonable cost.

A rough estimate of the international costs can be made on the basis of several recent studies on verification in connection with the draft chemical weapons convention.[9,10,11] For a total of 400 inspections per year, probably more than enough (for example, 2 declared sites selected by each State party, 78 selected by the inspectorate, and 100 challenge inspections or special monitoring of declared occurrences), about 90 inspectors and 162 additional staff would be ample.[12]

For this case (case A) the annual costs (not including start-up) can be estimated at the amounts shown in the table in millions of US dollars:[13]

	Case A	*Case B*
Inspectors	$8.1	$2.25
Other staff	6.5	1.8
Travel	6.0	2.5
Other costs	1.5	0.4
Equipment	1.0	0.5
Overhead	1.0	0.5
TOTAL	$24.1	$6.0

This is a very liberal estimate. Divided among over 100 States parties, $24.1 million is a small sum, to be weighed against the security benefits and savings realized—including decreased expenditures on defence and on weapons for deterrence, and increased access to biological intelligence (which is particularly difficult to obtain). The trade-offs are discussed by Beck.[9] Compared with the many thousands of sites to be inspected regularly, and the correspondingly high costs, under the Treaty on Conventional Armed Forces in Europe, for example, a biological weapons verification protocol would be a real bargain.

Notes

1 Yasushi Akashi, Message to the participants at the XIIth Kulungsborn Colloquium on the Prevention of a Biological and Toxin Arms Race and the Responsibility of Scientists, Kulungsborn, German Democratic Republic, September 1990.

2 Report of the Committee of the Whole, in "Final Document, Second Review Conference of the Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction" (Geneva, 30 September 1986) (BWC/Conf.II/13).

3 Winfried Lang, "Taking the pulse of the biological weapons régime", *Disarmament*, vol. X, No. 1 (Winter 1986-1987), pp. 44-51.

4 E. Geissler, ed., *Strengthening the Biological Weapons Convention by Confidence-Building Measures*, SIPRI Chemical & Biological Warfare Studies, No. 10 (Oxford, Oxford University Press, 1990).

5 Final Declaration (BWC/Conf.II/13/II), in *Final Document, Second Review Conference*.

6 J. A. Miller, "Diseases for our future", *BioScience 39*, 509 (1989).

7 S. S. Morse, "Regulating viral traffic", *Issues in Sci. and Tech.*, 81 (Fall 1990).

8 M. L. Wheelis, "The role of epidemiology in strengthening the Biological Weapons Convention", *Prevention of a Biological and Toxin Arms Race and the Responsibility of Scientists* in, E. Geissler and R. Haynes, eds. (Akademie Verlag, Berlin, 1991).

9 H. Beck, *Verifying the Projected Chemical Weapons Convention: A Cost Analysis*, AFES-Press Report No. 13 (Mosback, Federal Republic of Germany, 1989).

10 R. Sutherland, "The chemical weapons convention and the international inspectorate: a quantitative study", Verification Research Unit, Department of External Affairs and International Trade Canada (Canada, August 1990).

11 J. Grotte, S. Leibbrandt and D. Schultz, *Inspection Costs for a Multilateral Chemical Weapons Convention* (Institute for Defense Analyses, Alexandria, Va., June 1990).

12 The results of trial inspections reported to the Conference on Disarmament (see, for example, trial inspection reports by the United Kingdom (CD/1012 and CD/921); the Union of Soviet Socialist Republics (CD/966), and Canada (CD/1030/ Rev.1)) suggest that an average of 3 days, 3 inspectors and 3 assistant staff per inspection would more than suffice for biological inspections. Sutherland (see note 10) estimates 40 inspection days per year per inspector and 0.8 staff member at headquarters per inspector; thus, 90 inspectors would be needed, with a staff of 72 remaining at headquarters and 90 assistants participating in

inspections, making a total of 252 persons. Allotting to each inspector 40 inspection days or 13.3 inspections, 2 days per inspection for travel, and 130 days per year for weekends and holidays, leaves 163 days per year for the preparation and follow-up of inspection and for possible sick leave, i.e. 12.3 days per inspection.

13 Travel costs are estimated here on the basis of $2,500 per person per inspection; labour costs, at $90,000 per inspector and $40,000 per staff member; other costs (training, administration etc.), as 10 per cent of labour costs. Overhead is based on the $1 million annual running expenses of a modern laboratory building housing 350 persons in an expensive location in the suburbs of New York City. Equipment is based on Beck's estimate (see note 9) of $2 million per year for the "control phase" of the chemical weapons convention (after the first ten years), and the fact that considerably less instrumentation will be employed for biological verification. The total annual cost on a per-inspector basis, $268,000 for case A and $240,000 for case B, is in the same range as the estimates for a chemical weapons convention ($200,000-360,000) (see notes 9,10,11).

Annex

Proposals for the Third Review Conference of the Biological Weapons Convention

submitted by
The Federation of American Scientists Working Group
on Biological and Toxin Weapons Verification
September 1990
(Excerpts)

Short-Term Proposals for Immediate Action by the Third Review Conference

Article I

Proposals:

A The Review Conference should reaffirm that the creation, by any means, of biological agents or toxins with altered properties that might increase their usefulness as weapons agents is not justified under the BWC for any military purpose, including protection against possible hostile use.

Rationale:

The intent of the Convention needs to be clarified in this regard because the creation of new and novel warfare agents (through genetic engineering or other biotechnologies, for example) might be contemplated for protective purposes such as threat assessment or the development of specific detectors or vaccines. Suspicions that activities of this kind may be taking place would undermine the Convention. New pathogens pose a threat to world health and welfare that outweighs any possible protective value. The use of standard cloning vehicles would not be affected.

B The Review Conference should reaffirm that all biologically produced chemicals, whatever their origin or method of production, of types and in quantities not justified for prophylactic, protective or other peaceful purposes are included under "other biological agents or toxins" covered by the Convention.

Rationale:

Chemicals produced biologically that are not normally toxic but are toxic at non-physiological doses (certain hormones for example) are similar to other biological agents and toxins in terms of methods of production, dosage and quantity required for use as weapons, and means of verification. Like classical toxins, they can be produced readily in quantity, using cloning techniques, in microorganisms. All harmful chemicals are covered under the draft Chemical Weapons Convention (CWC); if they are biologically produced, however, like classical toxins, they are also covered under the BWC.

C The Review Conference should reaffirm that all microbial and other biological agents and toxins deleterious to plants, animals and humans are included under the agents covered by this treaty.

Rationale:

The BWC prohibits "microbial or other biological agents . . . of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes", without any limitations regarding the target organisms or the nature of the biological agents. Green plants and livestock are susceptible to numerous deleterious agents, whose deliberate introduction could affect food production and cause direct injury to a human population. Since many modern societies are based on monoculture (rice in the Orient, corn in the middle Americas, taro in parts of Africa, etc.), large-scale outbreaks of plant diseases or insects could produce catastrophic effects. Advances in biotechnology have greatly magnified the dangers of biological anti-plant agents.

Article III

Proposal:

A The Review Conference should agree that the States Parties will not transfer to non-Parties any biological agents or toxins or any material, equipment or information under their jurisdiction or control that is relevant to permitted or prohibited biological activities directly related to the Convention, nor will they undertake or permit, with non-Parties, any personnel transfer, cooperative activity or other collaboration involving otherwise permitted activities directly related to the Convention.

Rationale:

Because many protective activities have dual significance, and because a good defense is generally considered to be a prerequisite for offensive use of BW, this measure would eliminate any form of cooperation between a Party and a non-Party that could contribute to the proliferation of BW. Moreover, it may provide an incentive for non-Parties to join the Convention. This non-proliferation measure is intended to extend the prohibition on assistance for non-peaceful purposes with a voluntary renunciation of any assistance to non-Parties to the Convention in the area of permitted activities directly related to the Convention. (The phrase "permitted activities directly related to the Convention" is the term used in the Final Declaration of the Second Review Conference in setting up criteria for information exchange, to specify activities for the purpose of protection against the hostile use of biological weapons.)

Article IV

Proposal:

A The Review Conference should agree that States Parties will declare annually what actions they have taken to assure domestic compliance with the Convention.

Rationale:

Article IV of the Convention requires Parties to take measures to assure domestic compliance with the Convention. Many Parties to the BWC have not informed other Parties of the measures that they have taken with regard to this Article. The United States enacted a specific BWC implementation law in 1990 and similar measures are known to have been taken by a number of other Parties. An exchange of information on all actions taken to assure domestic compliance will encourage all Parties to act and will increase confidence in the Convention.

Article V

Proposals:

A The Review Conference should call a series of meetings of experts from the Parties to draw up a draft proposal for a Protocol to the BWC on verification.

Rationale:

The report of the Committee of the Whole at the Second Review Conference stated that "most delegations agreed that the verification of compliance and complaints procedures required improvement". The above action would provide a mode of consultation and cooperation for resolving future compliance concerns. The draft Protocol proposal would be submitted to the States Parties to serve as a basis for subsequent negotiations. By setting this process in motion, the Third Review Conference would do much to strengthen confidence in the efficacy of the BWC.

B The Review Conference should declare that any State Party has the right to request the Secretary-General of the United Nations to conduct a timely fact-finding inquiry into compliance concerns and should stress the obligation of States Parties to cooperate with such an inquiry. The Conference should request the General Assembly to pass a resolution enabling the Secretary-General to respond to such requests.

Rationale:

The Secretary-General already has the authority—under the United Nations General Assembly resolutions 37/98 D, 39/65 E, and 42/37 C—to conduct an inquiry into the *use* of biological weapons. This proposal would empower the Secretary-General, following procedures available to him, to conduct an inquiry, with the assistance of qualified experts, into compliance concerns that do not entail use. Australia, Belgium, the Federal Republic of Germany, France and the United States jointly made such a proposal and Nigeria made a similar proposal at the Second Review Conference. The inquiries carried out by the Secretary-General in 1984, 1985 and 1986 with respect to allegations of use of chemical weapons provide an appropriate model.

Provision should be made for the Secretary-General to receive confidential communications from non-governmental organizations and private individuals, especially concerning any suspicious activities in declared or undeclared sites, in a way that would protect the identity of the informant.

C The Review Conference should recommend that States Parties adopt national legislation that would require adherence, within their jurisdiction and control, to the levels of containment for infectious agents set by the World Health Organization (WHO) and would require that new, recombinant and other novel infectious agents be subjected to the highest level of containment appropriate, by WHO standards, for the genetic donor, recipient, or any closely-related agent, or for the known or conjectural risk.

Rationale:

WHO has described specific containment levels for work with pathogens of various risk groups. This proposal would counter the temptation to set aside precautions to protect world health and welfare in favor of expediting or concealing biological defense activities or prohibited activities.

D The Review Conference should agree that each State Party will declare annually all facilities, governmental and private, under its jurisdiction or control anywhere, that conduct research, development, testing, production or other permitted activities directly related to the Convention.

Rationale:

The intent of this proposal is to prevent or reduce the occurrence of ambiguities, doubts and suspicions in regard to activities permitted under the Convention. The States Parties agreed to a number of measures at the Second Review Conference, embodied in the Final Declaration, designed to enhance confidence in the Convention. One of the measures they agreed to was an exchange of information on very high containment [BL4] facilities and those that "specialize in permitted biological activities directly related to the Convention". This proposal extends that measure to all permitted activities directly related to the Convention (i.e., for the purpose of protection against the hostile use of biological weapons) without regard to containment or specialization.

Many States Parties have not made any declarations pursuant to the measures agreed upon at the Second Review Conference. While one may presume that nations omitting declarations have nothing to report, stating this explicitly would remove suspicions concerning States' motives for not filing the required reports. The Third Review Conference, therefore, should reaffirm all the measures adopted at the Second Review Conference under Article V and request each State Party to submit annual declarations responding to those measures and to the additional measures proposed here, even if only to state that it has nothing to report, or that it is unable to respond for a given reason.

E The Review Conference should consider the desirability of establishing a continuing body to oversee and facilitate the functioning of the BWC during the intervals between Review Conferences. This body could be called the "Oversight Committee".

Rationale:

The Oversight Committee could function, *inter alia*, to oversee the collection of annual declarations and their distribution and to report on the response; to facilitate the organization of Consultative Meetings of the Parties if they are requested; to support the Secretary-General in carrying out his responsibilities under the BWC, if requested; and to arrange informal discussions among States Parties concerning any compliance problem that may arise, or possible actions to increase the effectiveness of the Convention. The Oversight Committee could be designated from the ranks of the United Nations Representatives of the States Parties.

F The Review Conference should agree that States Parties will give advance notice of the time and site of any open-air military training operation in BW defense.

Rationale:

This proposal would provide confidence that any military training operations concerning BW would be defensive. Furthermore, military observers could be exchanged for monitoring operations of this type.

Article XII

Proposal:

A The Review Conference should agree that conferences of States Parties to review the operation of the Convention should be held at least every five years.

Rationale:

Conferences to review the operation of the Convention should be held at least every five years because of the rapid pace of scientific and technological developments in the fields relevant to the Convention.

Long-Term Proposals for Incorporation in a Verification Protocol

The Protocol should incorporate all the relevant short-term measures proposed above. The proposals under Article I are particularly important to affirm the scope of the Protocol.

Article V

Proposals:

A Require States Parties to adhere to the levels of containment for infectious agents set by WHO, and require new, recombinant and other novel infectious agents to be subjected to the highest level of containment appropriate (by WHO standards) for the genetic donor, recipient, or any closely related agent, or for the known or conjectural risk.

Rationale:

This measure will require activities with all hazardous infectious agents to be conducted in facilities with reporting requirements (proposed herein). Standards for specific agents in the categories designated by WHO have been set by, among others, the Federal Republic of Germany and the German Democratic Republic, and the U.S. Public Health Service. (See Erhard Geissler, ed., *Strengthening the BWC by Confidence-Building Measures*, SIPRI (New York: Oxford University Press, 1990), Annex 5.) These or other existing specifications could be adopted, or another set could be especially drawn up for the Protocol.

B Prohibit the open-air release of controlled agents, with the following exception for plant pathogens. Prohibit the open-air release of controlled plant pathogens for military purposes, including protection, and require that any open-air release of plant pathogens take place under controlled conditions.

Rationale:

There are certain stages of development that biological agents ordinarily must pass through in the process of weaponization. The more accessible developmental stages that can be monitored or restricted constitute "choke points", those places where the development of biological weapons can be intercepted most readily. The open-air release of agents is such a stage or choke point. It requires an isolated area and protection of observers. Moreover, it is more open to public or aerial surveillance than is work done under containment. The needs of research and industry make it impractical to apply a blanket prohibition to plant pathogens, however. The establishment of proper oversight regulations for the open-air release of controlled plant pathogens for peaceful civilian purposes should be part of the national implementation of the verification protocol.

C *Annual Declarations:*

Each State Party should be required to make routine annual declarations of the facilities and activities elaborated below, even if only to state that it has nothing to declare. Declarations of facilities will include the size of the facility, its auspices and sources of funding, its purpose, a brief description of all its activities, whether encapsulating protective clothing is available, the sources and quantities of each specific controlled agent (if any) that is handled and its disposition.

Rationale:

Routine annual declarations that are specific and mandatory will establish a standard and provide evidence of openness. Declarations will establish a base line against which national intelligence can be checked, and will simplify the task of inspection. Moreover, they put potential violators on notice of the requirements of the BWC and establish a chain of documentation that can be the foundation for domestic or international enforcement of the BWC. To the extent that the required declarations are comprehensive it will make all activities that might be relevant to the Convention subject to routine modes of verification, or, if not declared, subject to detection as violations, thereby eliminating questions of intent. States Parties will have to maintain registries of the specified facilities and activities, most of which will have peaceful purposes unrelated to the Convention but may have military potential. (In the United States, the requirement for declarations can help establish that at least some of the private firms that might be subject to these requirements comprise a "pervasively regulated industry", which would have the effect of reducing the extent of protection enjoyed by these firms against unreasonable searches provided in the Fourth Amendment to the United States Constitution.)

C1 All facilities containing agents belonging to the categories listed in Appendix A, in quantities greater than those noted therein, and all open-air field release sites for controlled plant pathogens. Facilities that function in an exclusively diagnostic or therapeutic manner are exempted from this provision; instead, they would only be required to report incidents of the possession or detection of controlled agents to a national health authority, which would make a single, annual diagnostic facility declaration specifying the facilities reporting controlled agents and the frequency of such encounters.

Rationale:

This proposal would disclose all military and civilian research and development with biological agents and toxins that could have weapons potential. Declaring all such facilities and opening them to routine inspections under proposal D1 would alleviate suspicions that any work in violation of the Convention is taking place in these facilities. It is necessary to include civilian facilities because they may be adequate for military purposes. This proposal deters illicit activities by making it more difficult to conceal them.

C2 All transfers of controlled agents into and out of the boundaries of the facilities declared under C1, including the source(s), quantities and destination(s) of the agents and a declaration of the peaceful purpose for which they will be used.

Rationale:

This proposal would establish a paper trail of all controlled agents, making it more difficult for governments and sub-national groups to acquire biological agents and toxins that could be used as weapons.

C3 All outbreaks of disease caused, or possibly caused, by agents belonging to the categories in Appendix A.

Rationale:

At the Second Review Conference, States Parties agreed to exchange information on "all outbreaks of infectious diseases and similar occurrences caused by toxins, that seem to deviate from the normal pattern as regards type, development, place, or time of occurrence." This measure has proved impractical, because diseases that deviate from the normal pattern are difficult to define. The new proposal would simplify which disease outbreaks are subject to reporting requirements without any stigma that an outbreak is suspicious or unusual in any respect.

C4 All facilities for the deliberate production of aerosols under Biosafety Level (BL)2 or higher containment.

Rationale:

Aerosols are a suitable method for delivering BW agents and toxins. Facilities for aerosol production and study are, consequently, of particular concern and the openness of such activities needs to be established. Aerosol equipment is identifiable; therefore, this can be considered a choke point. Most work with biological agents and toxins does not involve the deliberate production of aerosols, although some permitted activities do involve aerosol production.

C5 All BL4, BL3, and other special facilities possessing containment equipment and/or structural features (to be specified) designed to protect the environment and personnel outside the containment unit.

Rationale:

This declaration, together with the requirement to adhere in appropriate containment standards (Proposal V. A, above) would mean that all facilities working with agents requiring the specified containment must be reported. If prohibited activities were occurring in clandestine facilities, violation could be established either on the basis of non-reporting of containment facilities, or of inappropriate containment, thereby eliminating the need to establish purpose. All BL3 facilities are included because some countries might conduct prohibited activities in BL3 facilities if BL4 facilities were unavailable. The relevant design features and containment equipment to be reported should be listed specifically when the Protocol is drawn up.

C6 All military and all mass civilian immunization programs and all military programs for the development and usage of vaccines.

Rationale:

Immunization is not only a protective activity, but is generally considered to be a necessary preparation for offensive use of BW. Because objective tests can be carried out to monitor this provision, if necessary, it can be considered a choke point.

C7 All sites for open-air field-testing or training for protection against BW.

Rationale:

This information would facilitate monitoring by national technical means. Offensive field testing and training are choke points.

C8 The time and site of any open-air military operation that includes field testing or training in protection against BW, to be provided in advance on an *ad hoc* basis.

Rationale:

This provision would make possible routine monitoring of such operations to ensure that no offensive training is included. Field training is a choke point. The term "field testing or training" includes any open-air release of uncontrolled biological agents or simulants for purposes related to protection against the possible hostile use of biological weapons.

C9 A list of all publications based on work done at declared facilities. (This requirement would not include publications based on work carried out entirely in undeclared facilities at institutions that also include a declared facility.)

Rationale:

This would provide invaluable information on the openness of activities at declared facilities. The cumulative declarations would constitute a resource and guide for the inspectorate (described below).

D Establish a Technical Secretariat/Inspectorate to administer the Protocol.

Rationale:

The functions of the Secretariat/Inspectorate would include compiling and checking annual declarations, carrying out inspections, disseminating information, organizing an information exchange, organizing and coordinating personnel exchange programs, and organizing assistance to States Parties endangered, threatened or injured by BW.

The organization and governance of this body could be based on the Technical Secretariat/Inspectorate under negotiation for the CWC, including provisions for confidentiality. Many functional aspects of the body, its relationship to the analagous CWC body and provisions for its funding, will have to be established.

E Establish procedures for three types of inspections:

E1 Declared facilities. The Inspectorate would conduct a fixed number of inspections each year, on short notice, with each State Party allowed to request a certain number of inspections, chosen from declared sites within any State Party. These requests would not be linked to any allegations of breach of the Convention. The Chief of the Inspectorate would also choose a number of sites to inspect each year, including, especially, sites in States Parties not otherwise inspected for the year and sites the inspection of which would (in the opinion of the Inspectorate) contribute to the effectiveness of the treaty regime.

Rationale:

The non-confrontational character of the system could perhaps be enhanced as follows: States Parties would select sites for inspection at the start of each year and communicate them in secret to the Inspectorate, which would then carry out those inspections, plus those chosen by the Inspectorate. The Inspectorate would determine the order in which to carry out the inspections so that no one would know who had designated which inspection. At the end of the year each Party would affirm that its requests had been carried out, without divulging which they were.

Provision could be made for the inspectorate to receive confidential communications from non-governmental organizations and private individuals, especially concerning any suspicious activities in declared or undeclared sites, in a way that would protect the identity of the informant.

This proposal is based in part on the successful inspection experience under the Stockholm Document, and on a recent British proposal for the CWC (CD-CW/WP232, 30 March 1989). It would constitute a more economical and efficient mechanism than routine inspection of declared facilities, and still serve as a deterrent to prohibited activities.

The British proposal cited above suggests that similar inspections would have the following advantages:

- a manageable number of inspections;
- attention focused on declared facilities of most concern both to the Convention and to the States Parties;
- the mandatory nature and very short advance warning would provide a high level of reassurance and deterrence;
- the targeted nature of the system would enable the vast numbers of facilities involved to be subjected to verification at a high level of cost-effectiveness; and
- the absence of expressed doubts about compliance would give the system a routine character.

E2 Challenge Inspections. The Inspectorate would conduct a challenge inspection of any site on short notice without right of refusal, at the request of any State Party for clarification of doubts about compliance.

Rationale:

When suspicions of violation of the Convention arise, a mechanism to carry out a rapid inspection of the relevant facility is necessary. Details of this procedure could be borrowed, wherever possible, from the challenge inspection procedure under negotiation for the CWC.

E3 *Special Monitoring*. Activities to be monitored would include: announced open-air dissemination of BW simulants, BW training operations, declared immunization programs, and outbreaks of disease caused by controlled agents.

Rationale:

Monitoring could be carried out by the Inspectorate or by a roster of experts at the request of the Inspectorate for the purpose of verifying declarations and assuring that no prohibited activities occur.

Towards the Third Biological Weapons
Convention Review Conference

The State of the Biological Weapons Convention

Barend ter Haar

The Geneva Protocol of 1925

By learning to understand the causes of disease and by mastering methods of combating disease, man has also obtained the power to use disease for hostile purposes. An important milestone in the efforts to prevent such misuse of science and technology is the Geneva Protocol of 1925, which not only reaffirmed[1] the prohibition of the use of chemical weapons, but extended this prohibition to "the use of bacteriological methods of warfare".

Inadequacies of the Protocol

The inadequacies of the Protocol are, however, numerous. They fall into three categories: scope; confidence-building and verification; and world-wide application. These categories are discussed below.

Scope

1 The Protocol prohibits the use only *in war*. It could therefore be argued that in internal types of armed conflict the Protocol is not applicable.

2 Some parties have reserved the right to use chemical and biological weapons against non-parties.

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3 Many parties have reserved the right to use chemical and biological weapons against parties that violate the Protocol.[2]

4 The Protocol does not prohibit research, development, production and stockpiling of these weapons.

5 It is not clear whether the Protocol covers only lethal warfare agents or also non-lethal agents (such as tear gases).

6 It is not clear whether the Protocol covers only the use of agents directly against humans, or whether it also covers hostile use of such agents against animals (for example cattle) and plants.

7 The term "bacteriological" does not include all possible types of biological warfare agents (because in 1925 micro-organisms such as viruses were not yet known). The Protocol is nevertheless generally understood to encompass all types of micro-organisms.

Confidence-building and Verification

8 The Protocol does not provide for measures to give confidence that other parties are honouring their obligations.

9 The Protocol does not provide for measures for investigating doubts about compliance.[3]

10 The Protocol does not have a mechanism for dealing with violations.

World-wide Application

11 During the first decades of its existence the effectiveness of the Protocol was limited because some major countries did not ratify the Protocol although they had originally signed it. Japan ratified it only in 1970 and the United States in 1975. Now, however, its membership is virtually universal.

Implications of the Shortcomings

As science and technology developed further after 1925, these shortcomings became more apparent. Biological weapons were developed, produced (among others by France, Japan, the United Kingdom and the United States) and even used. Although the military utility of these weapons remained very questionable, there was a growing danger that the prohibition of their use would erode.

At the end of the 1960s, therefore, negotiations began on a treaty that would complement the Protocol with a comprehensive ban on chemical and biological weapons. As chemical weapons were considered to be a more real threat than biological weapons, most Western countries were not willing to agree to a comprehensive prohibition of chemical weapons without adequate assurances that the obligations would be honoured by all parties. This would, however, require on-site inspections and the Soviet Union was vehemently against such inspections. The issues of chemical and biological weapons were therefore uncoupled and in 1972 a convention was signed that was limited to a prohibition of biological and toxin weapons.

Toxin weapons are, technically speaking, chemical weapons[4] but because they are normally produced by biological organisms such as microbes, animals and plants, and production therefore requires facilities similar to those required for the production of biological warfare agents, they were included in the scope of the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction.

The Biological Weapons Convention

The biological weapons Convention made up for many of the shortcomings of the Geneva Protocol. Although the Convention did not explicitly prohibit the use of these agents, the undertaking in article I "never in any circumstances to develop, produce, stockpile or otherwise acquire or retain" such agents "of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes" left no doubt that their use would never be permitted. But the provisions for lodging complaints and initiating investigations were very weak. It should be noted that several of the concepts that were dropped during the negotiations, such as openness of research for investigation and challenge inspections, are now being considered again with a view to strengthening the Convention.

Inadequacies of the Convention

To facilitate a comparison with the Geneva Protocol, we can classify the weaknesses of the Convention into the same three categories.

Scope

1 The Convention does not prohibit research and allows development, production and stockpiling in quantities justified for "protective or other peaceful purposes" without setting a clear and objective limit on such quantities.

2 The Convention does not explicitly cover biological and toxin agents directed against animals and plants.

Confidence-building and Verification

3 Routine measures to give confidence in compliance are missing.

4 Doubts about compliance cannot effectively be investigated.

5 The Convention does not provide mechanisms for dealing with violations.

World-wide Application

6 Several relevant countries did not become parties.[5]

Implications of the Inadequacies

A comparison with the shortcomings of the Geneva Protocol illustrates the accomplishments of the biological weapons Convention. The remaining weaknesses were very serious, but in 1972 the military relevance of biological weapons was still considered to be so slight that it was possible to reach an agreement on a comprehensive, but basically flawed, ban on biological weapons.

However, around the time of the First Review Conference, in 1980, the Convention was assailed by allegations that the Soviet Union was violating it. An unusual anthrax epidemic in Sverdlovsk was suspected of being the result of an explosion in a biological weapons plant and the United States Government alleged that it had irrefutable proof that the Soviet Union was involved in the use of toxin weapons in Afghanistan, Laos and Cambodia.

Confidence in the Convention was undermined and, especially in the United States, the question was raised whether the Convention served any useful purpose or only provided a false sense of security. What would be the future of the Convention if confidence in compliance could not be restored? At least these issues helped to convince parties of the need for greater openness, not only in case of allegations, but as a matter of routine with regard to relevant research centres, such as the laboratory in Sverdlovsk, and to unusual outbreaks of diseases, such as the anthrax epidemic.

The Second Review Conference

It was in this atmosphere that the Second Review Conference convened in 1986. In its assessment of scientific and technological developments the United States stressed that, although in the 1980s no scientific breakthroughs had occurred, such as the development of recombinant DNA techniques in the 1970s, the adaptation of these earlier scientific advances to widespread applications might be of even greater relevance to the Convention. Of most concern were the improvements in the equipment used and the speed and cost of production and in the creation of safer conditions for handling biological materials. As a result, it had become more difficult to distinguish a large production facility from a laboratory, and the capabilities for breaking out of the Convention in a very short time had increased.

The great surprise of the Conference was the U-turn in the position of the Soviet Union. It suddenly emerged as a champion of strengthening the Convention with a legally binding verification régime. As the United States began at the same time to oppose a verification régime, it seemed that the Soviet Union had changed positions with the United States. The reason for the United States' opposition to a verification régime was, however, not a fundamental aversion to intrusive verification, as had been the case with the Soviet Union, but a fundamental lack of trust in its feasibility.

The other parties did not fully share the scepticism of the United States, but agreed that it would not be useful to start negotiations on verifying compliance with the Convention as long as the Conference on Disarmament was engaged in working out the verification provisions of a chemical weapons convention. These provisions should serve as a model for a possible verification protocol to the biological weapons Convention.

The best option therefore seemed to be to strengthen the Convention in the same manner as had been done at the First Review Conference. At that Conference the Final Declaration of the Conference had been used to record agreement on an interpretation of article V of the Convention. This procedure was used again. To describe the measures agreed at the Second Review Conference as "interpretation" or "clarification" of the Convention would, however, give a false impression of the innovative character of these measures. It could well be claimed that the confidence-building measures that were adopted in the Final Declaration amounted in fact to a sort of politically binding additional protocol to the Convention and their adoption came as close to amending the Convention as a Review Conference possibly could.

The main accomplishment of the Second Review Conference was probably the agreement to implement the following measures:

1 Exchange of data on laboratories:

a That "meet very high national or international safety standards . . .";

b That "specialize in permitted biological activities directly related to the Convention";

2 Exchange of information on "all outbreaks of infectious diseases and similar occurrences caused by toxins that seem to deviate from the normal pattern . . .";

3 Encouragement of the publication of results of biological research "directly related to the Convention . . .";

4 Promotion of contacts between scientists engaged in biological research directly related to the Convention.

The modalities of these measures were finalized in April 1987 by a meeting of experts.

From an East-West Issue to a North-South Problem?

Slightly more than a year after these confidence-building measures were finalized, reports began to appear about countries that seemed interested in acquiring biological weapons. The People's Democratic Republic of Korea, Iran and Iraq are among the countries mentioned. According to the United States Department of Defense in 1988, 10 countries possessed biological weapons,[6] and in September 1990 United States intelligence sources reported that Iraq had a sizeable stockpile of biological weapons. As a precaution, United States forces in the Gulf area were inoculated against anthrax.

The production and subsequent use of chemical weapons by Iraq had taught some important lessons. Iraq had in secrecy built production plants for chemical weapons, importing most of the necessary technology and materials from the West. Iraq had subsequently used chemical weapons in flagrant violation of the Geneva Protocol (to which it was a party). The industrialized countries could no longer close their eyes to the fact that their exports were sometimes used for the production and use of weapons of mass destruction. The signs that a few countries were actively trying to acquire a biological warfare capability therefore worried them. But what to do?

A combination of experience and deduction lead to the conclusion that a country that wants to produce biological weapons will probably try to acquire the following:

—Strains of the organisms (small quantities are sufficient)

—Equipment and materials for (large-scale) reproduction, such as fermenters, cultivating agents and harvesters

—Equipment for handling hazardous materials

—Equipment for conserving and disseminating agents.

The problem is that most of this is also needed for very peaceful purposes, such as the production of vaccines. The techniques used for the production of a vaccine against a disease and for the production of a warfare agent to disseminate the same disease are in fact strikingly similar. In both cases the organism that causes the disease is reproduced in large quantities. In the case of vaccine production, the disease-causing organism is, however, either changed or killed to prevent it from causing the disease.

A policy of simply denying countries the technology needed for health care and cattle-breeding would be unacceptable and, certainly in the long run, also impossible to implement. That is not to say that nothing can be done to prevent countries from producing or using biological weapons. Relevant research establishments and companies should be warned against the danger that they might unwillingly become involved in the production of biological weapons. In addition, particular relevant items, such as equipment for cultivating, harvesting and conserving biological organisms, could be brought under export controls, for example by requiring certain safeguards against misuse for biological weapon purposes. In the long run, however, a policy of non-proliferation is doomed, for by developing their own health-care infrastructure countries will automatically also obtain a capability to produce biological warfare agents. The only way to prevent the proliferation of biological weapons is therefore to strengthen the Convention.

The Concept of the Biological Weapons Convention and Its Limits

The concept underlying the biological weapons Convention is that, in order to prevent biological warfare effectively, not only should the use of biological weapons be prohibited, but also, as far as possible, the route to such use. The Convention therefore complemented the Geneva Protocol with a ban on the activities that necessarily precede any use of biological weapons, that is, their development, production and stockpiling. Many of the shortcomings of the Convention are the result of the fact that this concept is fine in theory but very difficult to implement. Most of the steps that can lead to the use of biological weapons are also necessary for civil purposes or for protection against these weapons and cannot therefore simply be prohibited. Production of vaccines against a micro-organism, for example, has much in common with the production of that micro-organism as a biological warfare agent. The prohibitions under the Convention are therefore limited to activities that are intended for biological warfare purposes.

The following table illustrates the fact that the Convention prohibits only a small part of all potentially relevant activities. Such activities that might lead to biological warfare can be undertaken for three different purposes: civil, protection against biological weapons and offensive use of biological weapons. Activities for the first two purposes are permitted. Activities for the latter purpose are usually, but not always, prohibited.

		Civil	*Protection*	*Offence*
1	Fundamental research	permitted	permitted	not prohibited
2	Applied research	permitted	permitted	not prohibited
3	Development	permitted	permitted	banned
4	Open-air testing	permitted	permitted	not prohibited
5	Development of production process	permitted	permitted	not prohibited
6	Small-scale production at pilot plant	permitted	permitted	banned
7	Production of precursors	——————not applicable——————		
8	Building of production installation	permitted	permitted	not prohibited
9	Production of agent	permitted	permitted	banned
10	Conservation of agent	permitted	permitted	banned
11	Development of dissemination techniques	permitted	permitted (?)	banned
12	Production of dissemination equipment	permitted	permitted (?)	banned

13	Filling of shells, bombs etc.	———not applicable———		banned
14	Integration in military doctrine	———not applicable———		not prohibited
15	Deployment	———not applicable———		banned
16	Training in use: with mock agents	———not applicable———		not prohibited
	Training in use: with real agents	———not applicable———		banned
17	Protection and prophylaxis	not applicable	permitted	–
18	Use	———not applicable———		not prohibited (but use is excluded)

The main criterion for prohibition or non-prohibition is the purpose of a given activity. That is why the Convention in its present form is extremely difficult to verify: intentions cannot be verified. However, on the basis of a few, relatively minor, additional obligations, a credible verification régime can probably be developed.

What Is Needed to Use Biological Warfare Agents as Weapons?

A country that wants to use biological weapons has first of all to acquire biological warfare agents. Because the most relevant agents have no, or almost no, civil applications, import of relevant quantities is usually impossible. A country can, however, often skip several of the steps mentioned above by importing relevant equipment and materials. But acquiring a capability to produce biological warfare agents is by no means identical with acquiring a capability to use biological weapons, which requires development of an effective weapons system and introduction of it in its armed forces. Acquiring a militarily relevant quantity of biological warfare agents is not easy, but it is a light task in comparison with the problems involved in turning the agents into a militarily useful weapon. It can be argued that so far nobody has ever succeeded in solving the latter problems. Whereas all steps leading to the production of a stockpile of agents could in theory be circumvented by imports, use of the agents as weapons requires a number of steps, such as integration in the military doctrine and training in use, that a country has of necessity to take itself.

Research and the Example of the Chemical Weapons Convention

The biological weapons Convention bans the development of such weapons, but does not mention research on them, because it was considered impossible to make a clear and objective distinction between research for permitted purposes and research with the intention of producing biological warfare agents. Take, for example, research into a rare and very virulent disease. The most obvious reason for such research would of course be purely medical or scientific. Such research might, however, be undertaken with the purpose of using the disease for biological warfare. Or a country might start (permitted) research to develop prophylactic and protective measures against feared use of the disease by another party. An independent observer would probably not be able to tell for sure for what purpose the research activities were undertaken. It was therefore argued that a ban on research would not lead to more confidence, but would instead lead to accusations that could neither be validated nor disproved.

Regrettably, it is very difficult to draw a clear line between research and development.

The main difference seems to be the intention with which the activities take place—but intentions cannot be verified. For all practical purposes, a sliding scale exists between fundamental research and development of new types of warfare agents. The methods used are essentially the same. And although the quantities of agents needed for research purposes will in general be smaller than the quantities needed for development, even the scale of the activities is not really a distinguishing factor.

The problem is further aggravated because even the equipment needed for the production of biological warfare agents on a relevant scale is not very different from the equipment used for research. A plant for the production of biological warfare agents could be hidden in what seems to be a laboratory. As a result, we cannot afford to avoid the problem of inspection of research establishments. It should, however, be added that little is known about how much of a biological agent would constitute a militarily relevant quantity. As the victims of a biological weapon attack will not line up to become infected, quite large amounts of agents might be necessary, especially if quick and widespread results are required.[7]

Part of the solution could possibly be found in an explicit prohibition of offensive research, but quantitative constraints on research and development for protective purposes and complete openness of all such research would probably be more effective.

The example of the negotiations on a chemical weapons convention is of only limited help. On the one hand, the projected convention does not provide for measures to verify the prohibition on the development of chemical weapons. The lack of a régime to verify what is going on in laboratories might not be fatal for the chemical weapons convention. Such verification is not considered essential as production of militarily relevant quantities of chemical warfare agents, in contrast to biological warfare agents, is not possible under the cloak of a research institute, but requires a full-scale production plant.

On the other hand, the projected chemical weapons convention will put research on the most risky chemicals under certain constraints. These chemicals, listed on schedule 1 of the draft Convention under preparation by the Conference on Disarmament, may be produced for research and some other permitted purposes, but every laboratory that produces or uses more than 100 grams should be declared. The total volume of all chemicals on this list in a country may never exceed 1 metric ton. The régime does not verify non-development of chemical warfare agents, because schedule 1 necessarily contains for the most part existing agents, not agents that might be in development. The principle of declaring relevant research facilities, of setting concrete limits to the quantities of relevant agents that may be produced or retained for permitted purposes[8] and of opening them for international on-site inspection is, however, a useful example for the biological weapons Convention.

Many other useful lessons can be drawn from the negotiations on a chemical weapons convention.[9] But it should be remembered that biological agents differ fundamentally from chemical agents, and that the objects of verification, such as potential production facilities, differ also. The most fruitful way to test the utility, for the biological weapons Convention, of the experience of the negotiations on the chemical weapons convention would be to use the concepts in trial inspections of facilities relevant to the biological weapons Convention.

What Can Be Done?

To make the biological weapons Convention into a ban that is capable of withstanding the pressures of developments in biotechnology and proliferation, several different types of measures are necessary: the existing provisions should be fully implemented and further elaborated, a verification protocol should be added and the ban should be made truly universal. Some of the measures that should be considered are discussed below.[10]

Make the Ban Global

More that 110 States are party to the biological weapons Convention, but many States are not. A concentrated effort should be made to make the ban global. In some cases a regional approach[11] might be necessary. Staying outside the Convention could be made less attractive by installing controls for the export of relevant technology to non-parties.

Widen Participation in the Data Exchange

The confidence derived from the agreed confidence-building measures is dependent on the implementation of the measures. Parties that until now have not taken part in the information exchange (about two thirds) should undertake to do so, because an effective ban on biological weapons is in their interest also.

Improve the Processing of the Data

The information provided by parties to the Department for Disarmament Affairs of the United Nations Secretariat is forwarded to all parties in the form received. The accessibility of the information could easily be improved if the Department would play a more active role in processing the data, for example by providing, on request, a translation of all information received.

Costs

An effective exchange of data requires an effective international mechanism. This does not have to be expensive, but even the smallest possible mechanism costs money. The Second Review Conference ignored this fact.[12] If a more effective functioning of the current measures is desired—this will be still more relevant when the next

Review Conference decides on supplementary measures—parties will have to pay for it.

Consultative Meetings Open to All Parties

A forum should be created to provide parties with feedback on the information they have given, and to discuss problems in the implementation of the measures. For this purpose, consultative meetings open to all parties should be convened on a regular basis (at least once a year). Useful lessons can possibly be drawn from the way the recently created Conflict Prevention Centre supports and discusses the confidence- and security-building measures that have been agreed by the States that participate in the Conference on Security and Co-operation in Europe (CSCE).[13]

Widen the Scope of Data Exchange on Laboratories

The Second Review Conference decided that data would be exchanged on two types of research centres: centres with very high containment facilities and centres that specialize in protection against biological weapons. Both categories were defined by the Meeting of Experts in 1987 in a restrictive way.

Confidence in the Convention would be strengthened if all laboratories that are involved in protection against biological and toxin weapons would be declared, even if they have no containment units[14] or do not specialize in this type of work.

A laboratory does not have to possess maximum containment facilities to be capable of producing biological warfare agents. Apart from the laboratories that are directly involved in protection against biological weapons and toxins, laboratories and other institutes can be of concern for one or more of the following reasons:

1 The types of agents that are handled, for example biological and toxin agents that have been developed and used as weapons in the past;

2 The presence of equipment for producing and conserving micro-organisms (such as large-scale fermenters), advanced equipment for harvesting (such as continuous flow centrifuges and filtration techniques), and equipment for long-term conservation of agents (such as freeze-drying equipment);

3 The facilities for containment.

The Third Review Conference could decide to convene an *ad hoc* meeting of experts, as the Second Review Conference did in 1986, to elaborate the details of an extension of the exchange of data on laboratories to facilities that meet one or more of these criteria. Lists of relevant agents and equipment would have to be revised regularly.

Constraints on Development and Production for Protective Purposes

Protection and prophylaxis against biological weapons should not be prohibited, but constraints would be useful. Quantities produced or stockpiled for these purposes could be strictly limited. Open-air testing with real agents could be subjected to notification in advance, and creation of new or altered potential warfare agents for protective purposes should be prohibited.

Open All Declared Facilities for Routine Verification

Exchange of relevant data builds confidence, but also gives rise to questions and will not dispel doubts unless a régime exists for verifying the accuracy of the data. A verification régime is therefore needed.

However, the Convention is almost unverifiable in its present form, because its scope depends on the intentions of a party. For example, a stockpile of a potential biological warfare agent might, after discovery, be described as a stockpile for several years of vaccine production and large-scale testing of protective measures. The credibility of such a declaration might be extremely low, but it would nevertheless be difficult to prove that it was false. Only if biological weapons were used, or were found in the operational stockpiles of standing armed forces, would a party not be able to find a justification.

This problem can be solved relatively easily if parties would agree to subject relevant items to obligatory declaration and quantitative constraints. This would provide the clear and objective criteria needed for an effective verification régime. A much more difficult problem is how an inspection team would verify the accuracy of the data provided. The experience of the negotiations on a chemical weapons ban has demonstrated that an effective verification régime can be developed only by trying out the proposed procedures in practice by means of trial inspections. This is the only way to find a realistic answer to the question whether verification of the biological weapons Convention is feasible.

A routine verification régime could possibly be modelled after the *ad hoc* inspection régime currently under negotiation for the projected chemical weapons convention. The essence of this régime is that a wide range of potentially relevant facilities would be declared and in principle opened for inspection, whereas the actual number of inspections will be small and will possibly be based on a combination of random selection and requests by parties.

Challenge Inspections

A routine verification régime cannot solve all doubts, in particular not about non-declared facilities. A challenge inspection régime will therefore be needed to complement a routine inspection régime. It would seem that the concept of "any time, anywhere inspection with no right of refusal", which was introduced in 1984 by (then Vice-) President Bush, is the best basis for an efficient régime. Commercial and other secrets could be protected by elaborate inspection procedures, shrouding of objects, selection of inspectors and rules for the protection of confidential information, but such rules should not form a pretext for excluding certain facilities or locations from inspection. Any exception to the "any time, anywhere" rule would open the possibility of keeping a stockpile or plant of biological weapons outside the scope of inspections and would therefore undermine the whole régime.

Conclusion

Since the biological weapons Convention came into force the fear that biological weapons might eventually be used has revived. The desire shown by some régimes to acquire biological weapons is probably the result of the growing interest in the production and use of weapons of mass destruction for terrorizing external and internal adversaries, and is facilitated by the development and world-wide spread of civil biotechnology that allows production of large quantities of biological agents within a short period of time.

A policy of non-proliferation might slow down this trend, but in the long run only an effective and world-wide ban on biological weapons has a chance of turning it. This will require more than adding a few confidence-building measures to the existing ban; it will rather require a structural rejuvenation of the biological weapons Convention through the addition of a verification protocol.

Notes

1 The use of poisons and poisoned bullets had been prohibited in the Hague Conventions of 1899 and 1907, but not all major Powers were parties to these Conventions and during the First World War the prohibition was seriously undermined.

2 When ratifying the Protocol in 1930 the Netherlands limited its reservation of the right of retaliation to the use of chemical weapons. When the United States ratified the Protocol in 1975 it did likewise. All other parties that reserved the right of retaliation did so for both chemical and biological weapons. Of course, States that became party to the biological weapons Convention *de facto* lost their right to retaliate with biological weapons.

3 As a result of the allegations of the use of chemical weapons in South-East Asia and Afghanistan, and in the war between Iraq and Iran, the Secretary-General of the United Nations was requested by the General Assembly to devise procedures for effective investigation and to investigate any future reports.

4 Biological warfare agents are living organisms, whatever their nature, or invective material derived from them, which are intended to cause disease or death in man, animals or plants, and which depend for their effects on their ability to multiply in the person, animal or plant attacked. Chemical agents, in contrast, do not multiply, but can be employed in warfare because of their direct toxic effects on man, animals and plants. Toxins are a special category of chemical agents, because they are produced by living organisms, although they do not reproduce themselves.

5 The People's Republic of China and France did not in the beginning become parties, but eventually acceded. Several important countries in the Middle East are however still not parties.

6 Statement of Thomas J. Welch, Deputy Assistant to the United States Secretary of Defense, in a hearing on biological warfare testing on 3 May 1988 before the Subcommittee on Arms Control, International Security and Science of the Committee on Foreign Affairs, the Subcommittee on Energy and Environment of the Committee on Interior and Insular Affairs, and the Subcommittee on Military Installations and Facilities of the Committee on Armed Services.

7 Large-scale and quick production might not be as easy as is sometimes suggested when the possibilities of breaking out of the Convention are discussed, as is illustrated by the fact that according to press reports the United States did not produce sufficient serum against anthrax for its armed forces in the Gulf in the period between the first report about such inoculation (*Time*, 1 October 1990) and the announcement by the Pentagon on 28 December 1990 that inoculations would start soon, even

if one allows for the fact that the standards for purity, etc., for vaccines are much higher than for biological warfare agents.

8 Of course, the limits on quantities for permitted purposes should be set much lower than the limits for chemical agents.

9 This point is elaborated in detail in the forthcoming publication *The Future of Biological Weapons* by Barend ter Haar, to be published as a Washington Paper by the Center for Strategic and International Studies in Washington, D.C., and Praeger Publishers.

10 Attention is drawn especially to the *Proposals for the Third Review Conference of the Biological Weapons Convention* and the report on *Implementation of the Proposals for a Verification Protocol to the Biological Weapons Convention* of the Working Group on Biological and Toxin Weapons Verification of the Federation of American Scientists. Thanks to the co-operation of many experts with different backgrounds and the thorough manner of operation of the Working Group, the reports are an important contribution to the discussion about strengthening the biological weapons Convention.

11 Egypt, Iraq and the Syrian Arab Republic signed the Convention but did not ratify it. Israel did not even sign it.

12 The role assigned to the Department for Disarmament Affairs is therefore very limited (no translation, no processing) because the services rendered by the United Nations to enable States parties to implement relevant parts of the Final Declaration of the Review Conference should "have no financial implications for the regular budget of the United Nations".

13 The decision to set up a conflict prevention centre was taken by the States participating in the Conference of the CSCE that took place in Paris from 19 to 21 November 1990. The CSCE is composed of all European States except Albania and includes the United States and Canada. Albania currently has observer status and has requested permission to participate fully.

14 This would bring the measure into line with the original agreement adopted at the Second Review Conference.

Documentation Relating to Disarmament

Statement of the Member States of the Warsaw Treaty

Budapest, 25 February 1991

The countries of Europe are liberating themselves from the legacy of the past, of the era of confrontation and division of the continent. The Charter of Paris has opened an era of democracy, peace and unity in Europe. The participating States of the all-European process build friendly relations, in respect for the Ten Principles of the Helsinki Final Act and on the basis of their common commitment to democracy, the rule of law and human rights.

The 22 States signatories of the Treaty on Conventional Armed Forces in Europe have stated in their Joint Declaration that they no longer consider each other as adversaries and will build new relations of partnership and co-operation. It was confirmed that every State has the right to belong or not to belong to a treaty of alliance. The end of the division of Europe provides an historic opportunity to give a new quality to relations in the field of security, while fully respecting the freedom of choice of States.

Bearing in mind the fundamental changes in Europe, and implementing the decision of the PCC's [Political Consultative Committee] session in Moscow on June 7, 1990, the member States of the Warsaw Treaty have decided, acting as sovereign and equal States, to dismantle the military organs and structures of the Treaty by March 31, 1991.

The participants of the session stated that the decision is destined to contribute to the further reduction of military potentials in Europe and to the transition from security structures based on blocs to all-European structures in the spirit of the CSCE Paris Summit accords. They expressed their resolve to ensure, through joint efforts, dynamic progress towards the objectives set at the Paris meeting.

In the new situation, the States represented at the session will actively shift the development of their relations onto a bilateral basis. This will correspond to their mutual interest in constructive and friendly relations, as well as to the new European realities.

The participants of the session stressed that the full implementation of the Treaty on Conventional Armed Forces in Europe and the Vienna document on confidence-building measures constitutes an important pre-condition for strengthening stability and security on the continent and for the further development of the Helsinki process.

Recent Books and Articles

Aga Khan, Sadruddin, Prince, ed. *Non-Proliferation in a Disarming World: Prospects for the 1990's.* Geneva, Bellerive Foundation, 1990. 347 p.

These papers are the result of a 1990 international colloquium on nuclear proliferation—the second in a series of colloquia designed to act as a backdrop to preparations for review conferences of the Treaty on the Non-Proliferation of Nuclear Weapons—which was held in Geneva, Switzerland, under the auspices of the Bellerive Foundation. Experts attending the colloquium, representing a wide range of perspectives and most major regions of the world, were asked to address the question of the proliferation of all weapons into the twenty-first century and the relationship of such proliferation to the future of the non-proliferation Treaty. Among the topics discussed were: strategic arms reductions, including presentations by the heads of the United States and Soviet delegations to those talks; the raising of barriers to the creation of new arsenals; the curbing of arms competition, most specifically in the Middle East; the development of an arms control framework acceptable to non-parties to the NPT; and the broader context of non-proliferation and practical steps for the 1990s.

Boserup, Anders, and Robert Neild. *The Foundations of Defensive Defence.* New York, St. Martin's Press, 1990. 222 p.

Edited by the late Anders Boserup and by Robert Neild, this volume comprises a collection of papers emanating mostly from a series of meetings of the Pugwash Workshop on Conventional Forces in Europe. The underlying concept is the restructuring of conventional forces in Europe so as to minimize their capability to attack while maintaining intact their capability to defend. The aim is to provide clear evidence of peaceful intent so as to be mutually reassuring and to enhance military stability. After addressing basic principles and combat dynamics, the papers address land, air and naval forces before addressing issues of negotiation.

Calderón, Félix. Las negociaciones sobre la regulación de armamentos y el desarme nuclear. Lima, Editorial y Productora Gráfica "Nuevo Mundo" EIRL, 1989. Tomo I: 509 p. Tomo II: 437 p.

The author, a career diplomat in the Peruvian Foreign Service, offers Spanish-speaking researchers an invaluable source of information on arms control and disarmament agreements covering the period following the Second World War. The first volume provides a most comprehensive, well-documented account of 13 arms control agreements, taking the reader step by step through the negotiating process leading to the conclusion of individual agreements. The second volume reproduces in the Spanish language the official texts of more than 40 treaties, declarations, conventions, memoranda, protocols and the like, relating to the agreements covered in the first volume.

Cuthbertson, Ian M., and Peter Volten, eds. *The Guns Fall Silent: The End of the Cold War and the Future of Conventional Disarmament.* New York and Boulder, Colorado, Westview Press, 1990. 196 p.

In the autumn of 1988, the Institute for East-West Studies established a Working Group on Conventional Arms Reductions and Stability. As the group met over the following two years, events in Europe occurred at what seemed to be an ever-increasing pace. When the group first met, the mandate for the Conventional Armed Forces in Europe (CFE) negotiations had not been agreed. By the time the group held a meeting in Vienna in April 1990, the political landscape of Europe had changed significantly and the CFE negotiations were proceeding rapidly.

This volume draws together a number of papers presented at the Institute's annual conference held at Frankfurt in October 1989. As the editors state in their introduction, the deliberations of the Working Group now appear to have been remarkably far-sighted, focusing as they did on the problems that might follow a first CFE agreement. The 13 authors of the papers, from Europe and the United States, offer thoughtful assessments of the political dimensions of change in Europe, analyse various structures for developing military stability at much lower levels of arms and forces, and comment on the need and practicability of controlling technology. In their conclusions, the editors make the point that if stability and security are to be maintained in Europe, all the nations in the Conference on Security and Co-operation in Europe process must grapple with the fundamental questions raised by the course of political and military change.

Fisas Armengol, Vicenç. *Defensa 2001: Una Proposta de Defensa no Ofensiva per a Espanya.* Barcelona, Fundació Jaume Bofill, 1990. 256 p.

In *Defensa 2001* an argument is set forth in favour of creating and instituting a purely defensive defence doctrine for Spain, to be implemented by the year 2001. Achievement of such an end would require cultural, economic, ecological, political and military changes of some significance, all of which the book addresses to varying degrees. While it is recognized that the proposal is risky and that it has shortcomings, the suggestion is that only by initiating other possibilities and encouraging debate can progress be made. The present structure, hardware and doctrine are seen as archaic and anachronistic, given the political changes taking place throughout Europe.

Defensa 2001 proposes significant reductions in military and civilian personnel serving in Spain's armed forces and attempts to spell out the costs and savings of such a plan. The questions of changes and reductions in military procurement are also addressed.

The volume, written in Esperanto, contains an eight-page abstract in English, on which this summary is based.

Garthoff, Raymond L. *Deterrence and the Revolution in Soviet Military Doctrine.* Washington, D.C., Brookings Institution, 1990. 209 p.

As the author himself states, the present study examines Soviet concepts of deterrence and the prevention of war and their similarities and differences with American thinking. The study's focus is on the new Soviet thinking of the Gorbachev period and the recasting of the Soviet concept of security, and hence the role of military power, which commands special attention. The development of Soviet military thinking since 1945 is, at the same time, carefully analysed by the author.

While important processes of change in Soviet political and military thinking are still under way, the author considers that it is not too early to address the question of their implications for United States policy. The concluding chapter is thus devoted to the implications for United States policy and strategy of the transformation of politics in the Soviet Union and, as a consequence, also in Europe.

Goodman, Lisl Marburg, and Lee Ann Hoff. *Omnicide: The Nuclear Dilemma.* New York, Praeger, 1990. 153 p.

In their book *Omnicide: The Nuclear Dilemma*, Lisl Marburg Goodman, a senior clinical psychologist, and Lee Ann Hoff, a nurse-anthropologist and crisis specialist, wish to "lay to rest the myth of innate aggression—which would make warfare out to be as inevitable as the tides". In doing so, they seek to undercut advocates of nuclear deterrence and thereby further efforts to ensure a peaceful conclusion to the nuclear era.

They believe that the idea of innate aggression, which would make warfare inevitable, has encouraged "an abdication of responsibility" and thus has permitted a "few powerful individuals ... to convince us that they know better than we do". The authors claim that this "abdication" has promoted a "desensitization to nuclear realities" as expressed by personalities who either deny that nuclear war is possible or believe that such a war is inevitable, which they characterize as "omnicidal" behaviour. They base their position on the results of several surveys among children, teenagers and adults carried out in France, Germany and the United States.

The authors are optimistic that "omnicidal behaviour" can be overcome through education and a change in values.

Grove, Eric. *The Future of Sea Power*. London, Routledge, 1990. 280 p.

In his book, *The Future of Sea Power*, Eric Grove seeks to answer two main questions. First, how is sea power going to develop in the next few decades? And secondly, is it possible to develop a new theory of sea power for the future or are the old ideas still relevant? Grove reviews and analyses the changing military and economic roles of the sea, discussing the strategies, equipment and performance of navies in peace and at war. The effects of the evolving international political, legal and economic environments on the maritime power of nations are also examined.

In the final chapter of the book he attempts to develop three theoretical frameworks concerning sea power: the first covers the foundations of sea power; the second covers the roles of navies; and the third constructs a typology with which to categorize navies. He concludes that "Sea power, in short, has a sound and secure future."

Harle, Vilho, and Jyrki Iivonen, eds. *Gorbachev and Europe*. London, Pinter Publishers, 1990. 213 p.

In this book, the editors, who are with the Tampere Peace Research Institute, provide insight into the changing Soviet policy towards Europe since the rise of Mikhail Gorbachev. The book gives general background on the question, including historical and cultural developments in both Europe and the Soviet Union, and focuses on the role of Western European countries in new Soviet foreign policy. A final section deals with economic relations between the Soviet Union and Western Europe.

The book is part of the series *TAPRI Studies in International Relations*, which concentrates on international relations, security, disarmament, human rights and technology and co-operation in Europe.

Hippel, Frank von, and Roald Z. Sagdeev. *Reversing the Arms Race: How to Achieve and Verify Deep Reductions in the Nuclear Arsenals*. New York, Gordon and Breach Science Publishers, 1990. 432 p.

Reversing the Arms Race represents the joint efforts of the Federation of American Scientists and the Committee of Soviet Scientists for Peace and against the Nuclear Threat. The research undertaken jointly by members of these two organizations concerns the technical basis for agreements to drastically reduce the United States and Soviet nuclear arsenals. The volume explores the feasibility of extending arms control beyond launchers, missiles and bombers to the nuclear warheads themselves. The technical means of verifying arms control agreements are discussed for systems currently being negotiated as well as for some systems which are not.

The book, which comprises fourteen articles, is in three parts, under the following headings: verifying reductions in nuclear warheads; verifying limits on nuclear-armed cruise missiles; and the technical basis for warhead detection. Some articles were written jointly, some independently. Differences of opinion exist, but not on technical issues. A detailed list of the contents, outlining each of the articles, appears as an appendix. Earlier versions of a number of the chapters in this book appeared in the journal *Science & Global Security*.

Hoffman, Mark, ed. *UK Arms Control in the 1990s*. Manchester and New York, Manchester University Press, 1990. 221 p.

UK Arms Control in the 1990s, edited by Mark Hoffman, Lecturer in International Relations at the London School of Economics, is a collection of essays which takes a comprehensive look at how British arms control policy may be affected by recent changes in Eastern Europe. The book touches on varying aspects and approaches of British arms control policy, most particularly attitudes towards nuclear non-proliferation, the comprehensive test-ban treaty, chemical and biological weapons and conventional arms transfer restraint. The first part of the book examines those factors which have conditioned overall British arms control policy in the past; the second part focuses on specific areas of British arms control policy. In its concluding chapter, Mr. Hoffman argues that British arms control policy in the 1990s "must assume a character of facilitating, managing and institutionalizing changes in both European and international security" in response to the new post-cold-war security framework in Europe.

Kokosi, Richard, and Sergey Koulik, eds. *Verification of Conventional Arms Control in Europe*—Technological Constraints and Opportunities. SIPRI, Stockholm and Boulder, Colorado, Westview Press, 1990. 322 p.

Fifteen authors have contributed to this book, following discussions on some of the topics at a SIPRI workshop in May 1989. The editors and contributors assess current and emerging technological capabilities for the task of verification of conventional arms control in Europe and seek to demonstrate that existing technological means and methods will be able to verify the first Conventional Armed Forces in Europe agreement. Following an introduction by the editors, in part II the book addresses verification technology and methods, and in part III looks at methodological lessons learned from other verification experience, for example, with the INF Treaty, in the Sinai desert, and in the International Atomic Energy Agency. Part IV looks at information-sharing and organizational issues; and in part V the editors structure their findings to provide an overview of the concepts and methods described.

Lynn-Jones, Sean M., Steven E. Miller and Stephen Van Evera, eds. *Nuclear Diplomacy and Crisis Management*. Cambridge, Massachusetts, MIT Press, 1990. 347 p.

Nuclear Diplomacy and Crisis Management offers a series of perspectives on the role nuclear diplomacy has played in post-1945 diplomacy. In this volume, which is in two parts, the three editors have assembled contributions from 10 scholars and academicians addressing the issue. Part I concerns the general political implications of the nuclear revolution, and United States perceptions of the value of nuclear weapons in the early years of the cold war. Part II focuses on specific attempts to manipulate nuclear risks in crises.

The titles of the chapters and the authors are as follows: "The Essential Irrelevance of Nuclear Weapons: Stability in the Postwar World", by John Mueller; "The Political Effects of Nuclear Weapons: a Comment", by Robert Jervis; "A Nuclear Golden Age? The Balance of Parity", by Richard K. Betts; "A 'Wasting Asset': American Strategy and the Shifting Nuclear Balance, 1949-54", by Marc Trachtenberg; "Atomic Diplomacy during the Korean War", by Roger Dingman; "Nuclear Alerts in Crisis Management", by Scott D. Sagan; "To the Nuclear Brink: Eisenhower, Dulles, and the Quemoy-Matsu Crisis", by Gordon H. Chang; "Testing Massive Retaliation: Credibility and Crisis Management in the Taiwan Strait", by H. W. Brands, Jr.; "The Influence of Nuclear Weapons in the Cuban Missile Crisis", by Marc Trachtenberg; and "The Political Utility of Nuclear Weapons: the 1973 Middle East Crisis", by Barry M. Blechman and Douglas M. Hart. A transcription of White House tapes and meetings during the Cuban missile crisis is also included.

Paul, Derek, Hanna Newcombe, Betty Truman and Jennie Hatfield-Lyon, eds. *Disarmament's Missing Dimension: A U.N. Agency to Administer Multilateral Treaties*. Ontario, Science for Peace/Samue Stevens, 1990. 150 p.

Appreciating the fact that disarmament issues and treaties no longer concern only the United States and the Soviet Union, the Markland Policy Group addresses the implications of this trend. In their book *Disarmament's Missing Dimension*, they support the idea of creating an international agency under United Nations auspices to verify multilateral disarmament treaties. The book explores means by which such an agency could operate and offers a course of action for States to undertake to help establish such a framework. Without an international agency empowered to facilitate verification and to help ensure compliance, the Group argues, it will be difficult if not impossible for several limited-scope treaties currently under negotiation to reach fruition. Focusing on the chemical weapons convention that is being negotiated by the Conference on Disarmament in Geneva, the Group recognizes that, in order to be effective, the verification procedures will need to be intrusive. A successful verification agency to oversee a chemical weapons treaty could, the Group suggests, serve as a model on which other disarmament agreements could be based. In an extensive annex the book includes criticisms and comments on the authors' work.

Pianta, Mario, and Alberto Castagnola. *La Riconversione dell' Industria Militare*. Firenze, Edizioni Cultura della Pace, 1990. 211 p.

This volume, by two Italian economists with an international background, outlines strategies that could possibly contribute to the process of "disarming" the economy of Italy. Of course, the goal is not general and complete disarmament, but rather "fewer armaments, and a higher degree of common security" through a reduction of military expenditures. This leads the authors to consider specific measures of conversion in the military/industrial field, leading to progress towards a peace economy.

This volume also contains, in Italian translation, a small anthology of writings by other well-known experts in the field of disarmament and development, including Jonathan Feldman, Seymour Melman, Michael Renner and Herbert Wulf, as well as the final chapter of the United Nations expert study of 1982, *The Relationship between Disarmament and Development* (United Nations publication, Sales No. 82.IX.1).

Sims, Jennifer E. *Icarus Restrained: An Intellectual History of Nuclear Arms Control, 1945-1960*. Boulder, Colorado, Westview Press, 1990. 264 p.

In *Icarus Restrained*, the author, Jennifer E. Sims, provides an historical account of the thinking and reasoning behind United States nuclear strategy between 1945 and 1960. Initially written to fulfil the requirements of the author's doctoral dissertation, the volume discusses methodology and critiques early writings on arms control and nuclear-weapon procurement. Exhaustive references appear unobtrusively as end-notes after each of the book's seven chapters. The volume also contains a selected bibliography of relevant books, papers, articles and government documents.

Spector, Leonard S., with Jacqueline R. Smith. *Nuclear Ambitions*. Boulder, Colorado, Westview Press, 1990. 450 p.

Nuclear Ambitions is the fifth book in a series by Leonard Spector on nuclear proliferation dating back to 1984. This volume covers the years 1989 and 1990. The author surveys the nuclear programmes of 10 countries: Argentina, Brazil, India, the Islamic Republic of Iran, Iraq, Israel, the Libyan Arab Jamahiriya, Pakistan, North Korea and South Africa. The material is presented country by country, in regional groupings. A brief introduction on the region precedes each section.

In addition to the reports on specific countries, the author provides a general overview of the subject and addresses the changing American-Soviet relationship, ballistic missile proliferation, new patterns of nuclear trade, and nuclear submarines. In a separate section he analyses the controls and safeguards of the non-proliferation régime.

Nuclear Ambitions is heavily annotated, providing the scholar or student with valuable source references for further study. Maps, a glossary and several helpful appendices further add to the value of the book.

Taylor, William J., Jr., Cha Young-Koo and John Q. Blodgett, eds. *The Korean Peninsula: Prospects for Arms Reduction under Global Detente*. Boulder, Colorado, Westview Press, 1990. 275 p.
Published in co-operation with the Center for Strategic and International Studies, Washington, D.C., and the Korean Institute for Defense Analysis, Seoul.

In response to economic and political changes that have begun to take place in north-east Asia since the mid-1980s, the Center for Strategic and International Studies, in co-operation with the Korean Institute for Defense Analysis, gathered together American and Asian specialists on north-east Asian security issues to examine the impact of the new status of East-West relations on efforts to reunify Korea.

One major question addressed in the book is how recent changes in the communist world will affect political change in North Korea. The views expressed in the book reflect the diversity of thought on the subject.

The book is divided into three parts, covering the impact of global new détente, the context for arms control in the region, and issues of and prospects for arms control on the peninsula. Two articles in the book focus on the lessons to be learned from recent conventional arms control measures in Europe and their implications for security negotiations on the Korean peninsula.

UNIDIR. *Nonoffensive Defense: A Global Perspective*. New York, Taylor and Francis, 1990. 194 p.

In September 1989, the United Nations Institute for Disarmament Research (UNIDIR) and the United Nations Association of the United States (UNA USA) organized a symposium in New York on the subject of non-offensive defence. This book comprises the papers presented by 12 authors at that symposium. Divided into six parts, the book includes efforts to define defensive strategies; examines such strategies in the European bipolar context; looks at the situation in north-east and south-east Asia, and the possible applicability of defensive strategies; examines conflict situations in the Middle East and Central America; considers a global view of the problem; and concludes by reflecting on the discussions that took place at the symposium, indicating possible future directions for research.

Weston, Burns H., ed. *Alternative Security: Living Without Nuclear Deterrence*. Boulder, Colorado, Westview Press, 1990. 283 p.

Alternative Security sets out a number of approaches to achieving and maintaining international security without nuclear deterrence. All eight contributors provide cogent and original insights into the nature of security in the atomic-nuclear age. Writing from a military perspective, Professor Thomas F. Lynch, III, of the United States Military Academy at West Point discusses the alternative options offered by proposals for a strategic defense initiative (SDI), a non-offensive defence, a civilian-based defence, and an independent international peace-keeping force. He also describes recent advances in techniques for crisis prevention, arms control verification, military information exchange and changes in force composition and structure. Some of the same options are discussed from a scientific, technological perspective by Dr. Warren F. Davis. Professor Burns Weston, as an international lawyer, and Professor Robert C. Johnson, as a political-scientist, delineate strategies for expanding the use of non-military power and contracting the use of military power. The other contributors bring equally fresh analyses to the quest for security without nuclear deterrence.

Further Publications

Disarmament is unable to publish reviews of all books and articles which have been sent to the Editor. The following is a list of items received recently.

Beyond Cold War Thinking: Security Threats and Opportunities. Muscatine, Iowa, Stanley Foundation, 1990. 40 p.

Bluth, Christoph. *New Thinking in Soviet Military Policy*. New York, Council on Foreign Relations Press for the Royal Institute of International Affairs, 1990. 118 p.

Canada and International Safeguards: Verifying Nuclear Non-Proliferation. Ottawa, External Affairs and International Trade Canada, January 1990. 60 p. (Verification brochure No. 5)

Cheeseman, Graeme. *The Application of the Principles of Non-Offensive Defence Beyond Europe: Some Preliminary Observations*. Canberra, Australian National University, 1989. 18 p. (Working Paper No. 78)

Cheeseman, Graeme. *Australia's Defence White Paper in the Red*. Canberra, Australian National University, May 1990. 37 p. (Working Paper No. 82)

Deger, Saadet, and Somnath Sen. *Military Expenditure: the Political Economy of International Security*. Oxford, Oxford University Press for the Stockholm International Peace Research Institute, 1990. 186 p. (SIPRI strategic issue papers)

De Mille, Dianne. *The Control of Chemical and Biological Weapons (CBW): Strengthening International Verification and Compliance: summary of a conference held in Toronto 4-5 April 1989*. Ottawa, Canadian Institute for International Peace and Security, July 1990. 71 p. (Working Paper No. 25)

Dorn, A. Walter. *The Case for a United Nations Verification Agency: Disarmament Under Effective International Control*. Ottawa, Canadian Institute for International Peace and Security, July 1990. 41 p. (Working Paper No. 26)

Findlay, Trevor. *Green vs. Peace? The Johnston Atoll Controversy.* Canberra, Australian National University, May 1990. 18 p. (Working Paper No. 81)

Friedensgutachten 1990 (Peace Report 1990): *German Unity and the Future European Order of Peace and Security. By* Horst Afhedlt *and others.* Mosbach, Arbeitsgruppe Friedensforschung und Europäische Sicherheitspolitik (Peace Research and European Security Studies), 1990. 170 p. (AFES-Press Report No. 38)

Groupe de recherche d'information sur la paix (GRIP). *Mémento Défense —Désarmement 1990.* Brussels, GRIP, 1990. 287 p.

The Guide to Canadian Policies on Arms Control, Disarmament, Defence and Conflict Resolution 1990. Ottawa, Canadian Institute for International Peace and Security, October 1990. 439 p.

Hartley, Keith, and Todd Sandler, eds. *Defence Economics: The Political Economy of Defence, Disarmament and Peace.* London, Harwood Academic Publishers, 1990. p. 1-84 (Volume 1, No. 1, 1990)

Lindsey, George, and Gordon Sharpe. *Surveillance over Canada.* Ottawa, Canadian Institute for International Peace and Security, December 1990. 81 p. (Working Paper No. 31)

Lomas, Peter, and Harald Muller, eds. *Western Europe and the Future of the Nuclear Non-Proliferation Treaty.* Brussels, Centre for European Policy Studies in collaboration with the Peace Research Institute Frankfurt, 1989. 145 p.

Macintosh, James. *Confidence- and Security-Building Measures: A Skeptical Look.* Canberra, Australian National University, July 1990. 31 p. (Working Paper No. 85)

Mack, Andrew. *Arms Control in the Pacific: The Naval Dimension.* Canberra, Australian National University, August 1990. 28 p. (Working Paper No. 82)

Mack, Andrew. *CSBMs and Military Security.* Canberra, Australian National University, May 1990. 12 p. (Working Paper No. 83)

McKinlay, Robert. *Third World Military Expenditure: Determinants and Implications.* London, Pinter Publishers, 1989. 154 p.

Müller, Harald. *Falling into Line? France and the NPT.* Southampton, United Kingdom, Programme for Promoting Nuclear Non-Proliferation, 1990. 16 p. (Occasional Paper Six)

Nuclear Non-Proliferation: a Concept in Jeopardy? Heidelberg, Forschungsstätte der Evangelischen Studiengemeinschaft (Protestant Institute for Interdisciplinary Research), 1990. (Reprint from larger publication)

Olsen, Edward A. *ANZUS and Northeast Asian Alliance Cohesion.* Canberra, Australian National University, August 1990. 53 p. (Working Paper No. 86)

Remacle, Eric. *La Communauté Européne au Coeur du Nouveau Paysage Européen.* Brussels, Groupe de Recherche et d'Information sur la Paix, août-septembre 1990. 60 p. (Dossier "Notes et documents" No. 148-149)

Stock, Thomas, and Ronald Sutherland, eds. *National Implementation of the Future Chemical Weapons Convention.* Oxford, Oxford University Press for the Stockholm International Peace Research Institute, 1990. 171 p. (SIPRI Chemical and Biological Warfare Studies No. 11)

Thompson, Gordon. *Peace by Piece: New Options for International Arms Control and Disarmament.* Cambridge, Mass., Institute for Resource and Security Studies, January 1991. 25 p. (Working Paper No. 1)

The US/Australia Joint Facilities: Nurranger, Early Warning and Israel: An Exchange. By Andrew Mack *and others.* Canberra, Australian National University, May 1990. 16 p. (Working Paper No. 84)

Varas, Augusto. *Los Dividendos de la Paz: Desarme y Conversion Industrial.* Santiago, Facultad Latinoamericana de Ciencias Sociales, octubre de 1990. 34 p. (Relaciones internacionales y política exterior, No. 1)

Walker, R. B. J. *Security, Sovereignty and the Challenge of World Politics.* Canberra, Australian National University, August 1990. 28 p. (Working Paper No. 87)

Wautelet, Michel, and Christian Radoux. *Les Disciplines Scientifiques et Leur Intérêt Militaire.* Brussels, Groupe de Recherche et d'Information sur la Paix, mars 1990. 32 p. (Dossier "Notes et documents" No. 143)

West European Arms Production: Structural Changes in the New Political Environment. By Ian Anthony *and others.* Stockholm, Stockholm International Peace Research Institute, October 1990. 71 p. (SIPRI research report)

Wiseman, Geoffrey. *Common Security and Non-Provocative Defence: Alternative Approaches to the Security Dilemma*, Peace Research Centre, Australian National University, 1989. 101 p. (Peace Research Monograph No. 7)

Zanders, Jean-Pascal. *Le Programme Américain d'Armes Chimiques Binaires.* Brussels, Groupe de Recherche et d'Information sur la Paix, avril 1990. 47 p. (Dossier "Notes et documents" No. 144)

Other Recent United Nations Publications on Disarmament

Department for Disarmament Affairs

Disarmament Yearbook

The United Nations Disarmament Yearbook
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Topical Papers

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Disarmament Facts

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Disarmament Newsletter

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April—Volume 9, Number 2**

Miscellaneous

Programme of Training on Conflict Resolution, Crisis Prevention and Management and Confidence-building among African States:

Workshop for Senior African Military and Civilian Officials, Arusha, United Republic of Tanzania, February 1991.

United Nations Institute for Disarmament Research

Books

Aerial Reconnaissance for Verification of Arms Limitation Agreements: An Introduction, by Allen V. Banner, Andrew J. Young and Keith W. Hall, 1990, 166 p. (Sales No. GV.E.90.0.11)

Peaceful and Nonpeaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race, Bhupendra Jasani (ed.), 1991, published for UNIDIR by Taylor & Francis, forthcoming.

Research Papers

No. 7—*Science and Technology: Between Civilian and Military Research and Development. Armaments and Development at Variance*, by Marek Thee, November 1990, 23 p. (Sales No. GV.E.90.0.14)

No. 8—*Esquisse pour un nouveau paysage européen*, by Eric Remacle, 1991, 178 p. (Sales No. GV.F.91.0.2)

UNIDIR Newsletter

Vol. 3, No. 1, March/mars 1990, *Verification of Disarmament Agreements/La vérification des accords sur le désarmement*, 48 p.

Vol. 3, No. 2, June/juin 1990, *Research in North America/La recherche en Amérique du Nord*, 72 p.

Vol. 3, No. 3, September/septembre 1990, *Nuclear Non-Proliferation/*

La Non-Prolifération Nucléaire, 43 p.
Vol. 3, No. 4, December/décembre 1990, *Research in Western and Northern Europe (I)/La Recherche en Europe de l'Quest et en Europe du Nord (I)*, 72 p.

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Chronicle of Disarmament Events

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Amendment Conference of the States Parties to the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, New York

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Conference on Disarmament—*Ad Hoc Committee on Chemical Weapons, Geneva*

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Group of Governmental Experts to Carry Out a Study on International Arms Transfers (third session), New York

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Conference on Disarmament (first part of 1991 session), Geneva

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United Nations Regional Disarmament Workshop for Asia and the Pacific, Bandung, Indonesia

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